

## **EXHIBIT B**

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF TEXAS  
HOUSTON DIVISION**

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In Re BP plc Securities Litigation

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)  
) No. 4:10-md-02185  
) Honorable Keith P. Ellison  
)

**EXPERT REPORT OF CHAD COFFMAN, CFA**

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## I. INTRODUCTION

1. My name is Chad Coffman. I am the President of Global Economics Group, a Chicago-based firm that specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including, as here, in the context of litigation.

2. I have been asked by counsel for the Lead Plaintiffs in this matter to examine and opine on whether the market for BP plc (“BP” or the “Company”) American Depositary Shares (“ADSs”) was efficient during the Class Period and whether damages for each class member can be calculated based upon a common formula.<sup>1</sup>

3. In formulating my opinions, I have relied upon my knowledge, prior experience, and formal training in economics, finance, and statistics. In performing my analysis, I have examined a variety of materials including academic articles, SEC filings, public press articles, analyst reports, and stock price data. **Appendix A** presents a list of the materials I relied upon in reaching my opinions in this report. Global Economics Group is being compensated at an hourly rate of \$550 per hour for my work on this matter and my compensation is in no way contingent on the opinions provided or the outcome of this case. My qualifications are described below.

## II. QUALIFICATIONS

4. I hold a Bachelor’s Degree in Economics with Honors from Knox College and a Master’s in Public Policy from the University of Chicago. I am also a CFA charter-holder. The

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<sup>1</sup> The putative Class Period is from November 8, 2007 through May 28, 2010 based on the Memorandum and Order by the Honorable Keith P. Ellison (*See* Memorandum and Order dated February 6, 2013 at pp. 61-62). Note there is also a subclass of investors who purchased BP ADSs between March 4, 2009 and April 20, 2010 (*see* Second Consolidated Amended Class Action Complaint (“Complaint”) at p. 1). The analyses performed and the opinions reached in this report apply to both Class Periods.

CFA, or Chartered Financial Analyst, designation is awarded to those who have sufficient practical experience and complete a rigorous series of three exams over three years that cover a wide variety of financial topics including financial statement analysis and valuation.

5. I, along with several others, founded Global Economics Group in March 2008.<sup>2</sup> Prior to starting Global Economics Group, I was employed by Chicago Partners for over twelve years where I was responsible for conducting and managing analysis in a wide variety of areas including securities valuation and damages, labor discrimination and antitrust. I have been engaged numerous times as a valuation expert both within and outside the litigation context. My experience in class action securities cases includes work for plaintiffs, defendants, D&O insurers and a prominent mediator (Retired Judge Daniel Weinstein) to provide economic analysis and opinions in dozens of securities class actions as well as other matters. As a result of my involvement in these cases, much of my career has been spent analyzing and making inferences about how quickly and reliably, and to what degree, new information impacts securities prices.

6. My qualifications are further detailed in my curriculum vitae, which is attached as **Appendix B**.

### **III. SUMMARY OF OPINIONS**

7. After analyzing BP's ADSs throughout the Class Period and giving careful consideration to the efficiency factors described in detail throughout this report, I have formed the opinion that the market for BP's ADSs was efficient throughout the Class Period. This opinion is based upon my analysis described in **Section VII** below.

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<sup>2</sup> Global Economics Group was formerly known as Winnemac Consulting, LLC.

8. The remainder of this report is organized as follows: **Section IV** of this report provides an overview of BP and Plaintiffs' allegations; **Section V** discusses the reliance requirement and the "fraud on the market" theory; **Section VI** introduces the *Cammer* factors and other factors for evaluating market efficiency under the "fraud on the market" theory; **Section VII** evaluates the *Cammer* factors and other efficiency factors for BP's ADSs; **Section VIII** reviews additional items including BP's option activity during the Class Period, the trading of BP's common stock relative to BP's ADSs, and the ability to calculate damages on a class-wide basis in this matter; and **Section IX** offers my conclusions.

9. I reserve the right to amend this report to reflect any new information that becomes available to me.

#### **IV. OVERVIEW OF BP AND PLAINTIFFS' ALLEGATIONS**

10. BP is one of the world's largest international oil and gas companies. According to their annual 20-F filing with the SEC, for FYE 2009, BP operates "in more than 80 countries, providing [its] customers with fuel for transportation, energy for heat and light, retail services and petrochemicals products for everyday items."<sup>3</sup>

11. BP's total sales and other operating revenues for fiscal years ending December 31, 2008 and December 31, 2009 was \$361 billion and \$239 billion, respectively, and had annual profits of \$21.6 billion and \$16.8 billion for the same periods.<sup>4</sup> In terms of revenues, BP was the 4<sup>th</sup> largest corporation in the world only behind Royal Dutch Shell, Exxon-Mobil, and Wal-Mart in each of the years 2008, 2009, and 2010.<sup>5</sup>

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<sup>3</sup> BP 2009 20-F, p. 6.

<sup>4</sup> BP 2009 20-F, p. 12.

<sup>5</sup> [http://money.cnn.com/magazines/fortune/global500/2008/full\\_list/](http://money.cnn.com/magazines/fortune/global500/2008/full_list/)

12. BP's ordinary shares trade primarily on the London Stock Exchange while also trading on the Frankfurt stock exchange in Germany.<sup>6, 7</sup> In the U.S., BP trades on the NYSE in the form of American Depositary Shares ("ADSs")<sup>8</sup> where J.P. Morgan Chase is the depositary and transfer agent and each ADS represents six ordinary shares.<sup>9</sup>

13. Plaintiffs' Complaint alleges that the Defendants made materially false or misleading statements throughout the Class Period with regard to BP's safety measures that ultimately culminated in the explosion of the *Deepwater Horizon* oil rig on April 20, 2010 and caused the death of 11 crew members and led to a spill of approximately 5 million barrels over eighty-seven days which was roughly 1800% greater than Exxon Valdez spill.<sup>10</sup> Plaintiffs' Complaint further alleges that after the explosion of the *Deepwater Horizon* rig, BP continued to make materially false statements with respect to its ability to respond to and contain the spill as well as the true magnitude of the spill. Specifically, Plaintiffs' Complaint suggests BP should be held accountable for the following false or misleading statements and omissions that led to billions of dollars in investor losses in BP securities in the aftermath following the explosion:<sup>11</sup>

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[http://money.cnn.com/magazines/fortune/global500/2009/full\\_list/](http://money.cnn.com/magazines/fortune/global500/2009/full_list/)

[http://money.cnn.com/magazines/fortune/global500/2010/full\\_list/index.html](http://money.cnn.com/magazines/fortune/global500/2010/full_list/index.html)

<sup>6</sup> "Ordinary shares are the most common form of share in the UK. An ordinary share gives the right to its owner to share in the profits of the company (dividends) and to vote at general meetings of the company." <http://www.londonstockexchange.com/traders-and-brokers/security-types/ordinary-shares/ordinary-shares.htm>

<sup>7</sup> BP 2009 20-F, p. 96.

<sup>8</sup> "Sometimes the terms "ADR" (American Depositary Receipt) and "ADS" (American Depositary Share) are used interchangeably. An ADR is actually the negotiable physical certificate that evidences ADSs (in much the same way a stock certificate evidences shares of stock), and an ADS is the security that represents an ownership interest in deposited securities (in much the same way a share of stock represents an ownership interest in the corporation). ADRs are the instruments actually traded in the market." <http://www.sec.gov/investor/pubs/ininvest.htm>.

<sup>9</sup> BP 2009 20-F, p. 96.

<sup>10</sup> Complaint ¶¶ 2, 4, and 6.

<sup>11</sup> Complaint ¶ 8.

(1) BP's progress in implementing and complying with the safety recommendations from the Baker Panel; (2) BP's Operating Management System's ("OMS") application to BP operations that were not fully-owned by BP; (3) BP having completed the transition to OMS in the Gulf of Mexico in 2008; (4) BP's ability to respond to and contain a significant oil spill in the Gulf of Mexico; and (5) the spill-rate after the *Deepwater Horizon* explosion.<sup>12</sup>

## V. DISCUSSION OF RELIANCE REQUIREMENT

14. Class members' reliance on the alleged misstatements or omissions is a required element for Plaintiffs' claims. Plaintiffs assert the "fraud on the market" theory of reliance in this matter. The "fraud on the market" theory is based on the fact that in an efficient market (one in which widely-available public information is quickly incorporated into the market price), all purchasers implicitly rely on any misrepresentations or omissions since the value of those misrepresentations or omissions is incorporated into each class member's purchase price. The "fraud on the market" theory was first addressed by the U.S. Supreme Court in *Basic v.*

*Levinson*:

In an open and developed securities market, the price of a company's stock is determined by the available material information regarding the company and its business.... Misleading statements will therefore defraud purchasers of stock even if the purchasers do not directly rely on the misstatements.... The causal connection between the defendants' fraud and the plaintiffs' purchase of stock in such a case is no less significant than in a case of direct reliance on misrepresentations.<sup>13</sup>

15. As indicated in *Basic*, in an open, developed and efficient market, market prices reflect what is known about a company. If a company provides the market with misleading information regarding its financial strength or business practices, the market price will be inflated compared to what the price would have been if the truth were known (but for misleading

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<sup>12</sup> Complaint p. 2. Also, see Section X (Defendants Made Materially False and Misleading Statements and Omitted Material Facts During the Class Period and Subclass Period, ¶¶ 312-390).

<sup>13</sup> *Basic v. Levinson*, 485 U.S. 224, 241-42 (1988).



information). Thus, in an efficient market where plaintiffs prove there were material misrepresentations, all purchasers implicitly relied on those misrepresentations.

16. Determining whether the market for a security was “open and developed” or “efficient” to the degree required for a presumption of reliance under the “fraud on the market” theory is an empirical exercise. The esteemed economist Dr. Eugene Fama, in his seminal research, first outlined definitions of an “efficient market.”<sup>14</sup> He described different levels of efficiency which he called “weak-form,” “semi-strong-form” and “strong-form” efficiency.<sup>15</sup>

17. The market efficiency standard adopted by *Basic* as necessary for the presumption of reliance conforms to Dr. Fama’s “semi-strong form” efficiency. “Semi-strong form” efficiency implies that all publicly available information is reflected in a stock’s current market price. This implies that security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. *Basic* stated: “In an open and developed securities market, the price of a company’s stock is determined by the available material information regarding the company and its business.”<sup>16</sup> The Supreme Court’s effective adoption of the “semi-strong form” efficiency standard is economically sensible because it recognizes that insiders often possess non-public

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<sup>14</sup> Eugene Fama, “Efficient Capital Markets: A Review of Theory and Empirical Work,” *Journal of Finance*, Vol. 25, 1970, p. 383.

<sup>15</sup> “Weak-form” efficiency requires that historical prices are not predictive of future prices. Under this form of efficiency, excess returns cannot be earned using strategies based on historical prices. Therefore, technical analysis will not produce consistent excess returns over time. “Semi-strong form” efficiency implies that all publicly available information is reflected in a stock’s current market price. Security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. Under this form of efficiency, neither fundamental nor technical analysis can produce consistent excess returns. “Strong-form” efficiency implies all information in the market, whether public or private, is accounted for in the market price. In this market, investors cannot consistently earn excess returns over a long period of time even if they have inside information.

<sup>16</sup> *Basic v. Levinson*, 485 U.S. 224, 241 (1988).

information and that securities prices do not necessarily reflect this non-public information, but that to presume reliance, the market price must reflect publicly available information.

18. In the next section, I explain the factors that I understand are regularly considered by Courts in determining whether the market for a particular security is efficient.

## VI. CAMMER FACTORS

19. In *Cammer v. Bloom*, the Court identified the following factors as relevant to the determination of whether an efficient market exists for a given security: 1) average weekly trading volume, 2) analyst coverage, 3) market makers, 4) SEC Form S-3 eligibility, and 5) price reaction to unexpected information.<sup>17</sup>

20. The *Cammer* decision relied on Bromberg & Lowenfels's definition of efficiency.<sup>18</sup> As articulated below, the adopted definition of efficiency is clearly consistent with Fama's definition of "semi-strong" efficiency.<sup>19</sup> For the purposes of this exercise, I adopt Bromberg & Lowenfels's definitions for the terms "open," "developed," and "efficient" as described below:

*An open market* is one in which anyone, or at least a large number of persons, can buy or sell.

*A developed market* is one which has a relatively high level of activity and frequency, and for which trading information (e.g., price and volume) is widely available. It is principally a secondary market in outstanding securities. It usually, but not necessarily, has continuity and liquidity (the ability to absorb a reasonable amount of trading with relatively small price changes).

*An efficient market* is one which rapidly reflects new information in price.

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<sup>17</sup> *Cammer*, 711 F. Supp. 1264 (D.N.J. 1989).

<sup>18</sup> *Cammer*, 711 F. Supp. 1264 (D.N.J. 1989).

<sup>19</sup> Eugene Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance* Vol. 25, 1970, p. 383.

These terms are cumulative in the sense that a developed market will almost always be an open one and an efficient market will almost invariably be a developed one.<sup>20</sup>

21. While there is a clear and well-accepted economic theory of market efficiency, there are no broadly accepted bright-line empirical tests that allow one to classify a particular market as “efficient” or “inefficient.” In my view, the *Cammer* decision identified important metrics to consider when evaluating efficiency for purposes of the “fraud on the market” theory. I also consider a number of other factors beyond the *Cammer* factors. To be clear, since there are no bright-line tests for efficiency, it is important to consider the identified efficiency factors as a whole because none of the individual tests or metrics are determinative as to whether a particular market is efficient.

22. In the subsequent sections I evaluate each of the *Cammer* factors, as well as the following additional factors that are relevant to assessing market efficiency: 1) market capitalization, 2) bid-ask spread, 3) the fraction of shares held by institutional investors, and 4) autocorrelation (meaning whether there is a pattern in a security’s returns so that past returns have the ability to predict future returns).

23. In **Section VII**, I empirically evaluate each factor for the BP ADSs during the putative Class Period.

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<sup>20</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 2 (citing *Bromberg & Lowenfels*, Securities Fraud and Commodities Fraud, § 8.6 (Aug. 1988) (emphasis added)).

## VII. APPLICATION OF EFFICIENCY FACTORS TO BP ADSs

### A. OVERVIEW

24. After giving careful consideration to each of the efficiency factors, I find that each factor supports my opinion that the market for BP's ADSs was efficient throughout the Class Period. **Exhibit 1** summarizes how for each of the factors examined, the empirical evidence supports a finding that BP's ADSs traded in an efficient market. As further background to my analyses, **Exhibit 2** displays the BP ADS closing price and trade volume for each day throughout the Class Period.

25. In summary, and as discussed more fully below, the ADSs traded in an efficient market. First, the average weekly trading volume of the BP ADSs (4.08%) far exceeds benchmarks that courts have established and is high relative to other securities traded on the NYSE. Second, there was an abundance of securities analysts following and reporting on BP. Third, BP was F-3 eligible, which has the same requirements as S-3 eligibility. Fourth, the market capitalization of BP ADSs was greater than 96% of all firms on the NYSE and NASDAQ and the market capitalization for BP as a whole was greater than 99% of all firms on the NYSE and NASDAQ. Fifth, BP ADSs had a low bid-ask spread relative to other exchange-traded stocks. Sixth, BP ADSs actively traded on the NYSE, fulfilling the *Cammer* factor regarding market makers. Seventh, there was no consistent evidence of autocorrelation during the Class Period. Eighth, institutions, which are considered sophisticated and well-informed investors, held on average over 41% of the shares outstanding during the Class Period. Finally, there was a strong cause-and-effect relationship between new Company-specific information and the market price of BP ADSs during the Class Period. These factors all support the conclusion that BP ADSs traded in an open, developed, and efficient market throughout the Class Period.

## B. CAMMER FACTOR 1: AVERAGE WEEKLY TRADING VOLUME

26. The first *Cammer* factor is the average weekly trading volume of a security.

According to one authority cited by the *Cammer* court,

[T]urnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for a security is an efficient one; 1% would justify a substantial presumption.<sup>21</sup>

27. Volume, as a fraction of shares outstanding, is an important indicator of market efficiency. First, volume is objectively quantifiable and comparable across securities. Second, high volume is generally indicative of continuity, liquidity, and market depth which are highly indicative of market efficiency.<sup>22</sup> Third, substantial volume would indicate there is likely a market for the collection and distribution of information about the security. As Thomas and Cotter explains, “Trading volume was also considered as an eligibility standard because it affects information dissemination to the market, and was an important criterion for investment analysts in deciding which stocks to follow.”<sup>23</sup>

28. BP ADSs easily surpass the threshold level of average weekly trading volume. The average weekly turnover for the ADSs was 4.08%. **Exhibit 3** plots the ADSs’ trading volume as

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<sup>21</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 28 (citing *Bromberg*, et al.).

<sup>22</sup> Continuity means that trades may occur at any time. Liquidity in this context means that investors can convert cash into shares or shares into cash at a price similar to that of the prior trade (assuming no new information). William F. Sharpe, Gordon J. Alexander, and Jeffery V. Bailey, *Investments*, Prentice Hall, Fifth Edition, 1995, pp. 44-45. Bromberg and Lowenfels define a market that has continuity and liquidity as “the ability to absorb a reasonable amount of trading with relatively small price changes.” Bromberg & Lowenfels, *Securities Fraud and Commodities Fraud*, § 8.6 (Aug. 1988) as cited by *Cammer*, p. 2. Market depth refers to the number of shares that can be traded at quoted prices. A deep market will have significant orders on the buy and sell side so that the market can experience a relatively large market order without greatly altering the market price. See Yakov Amihud, Haim Mendelson and Lasse Heje Pedersen, 2006, “Liquidity and Asset Prices,” *Foundations and Trends in Finance* Vol. 1(4) pp. 269-364.

<sup>23</sup> Randall S. Thomas and James F. Cotter, “Measuring Securities Market Efficiency in the Regulatory Setting,” *Law and Contemporary Problems* Vol. 63, p. 108.

a fraction of ADSs outstanding for each week during the Class Period.<sup>24</sup> The volume of trading for the ADSs supports the conclusion that the market for this security was efficient throughout the Class Period.

29. Another measure of the concepts underlying this *Cammer* factor (continuity, liquidity, and market depth) is annualized turnover velocity, which is essentially the first *Cammer* factor expressed in dollar terms.<sup>25</sup> The advantage of this measure is that BP's ADS annualized turnover velocity can be compared directly with other stocks that trade on the same exchange based on exchange-reported statistics. The average annualized turnover velocity ratio for BP ADSs was 175% and 185% for all of 2008 and 2009, respectively, compared with the NYSE average of 193% and 120% over the same periods.<sup>26, 27</sup> Thus, BP ADSs had average annualized turnover that was similar to, or exceeded the average stock trading on the NYSE, further supporting that they traded in an efficient market.

30. In short, the high trading volume in the ADSs throughout the Class Period supports the conclusion that the market for this security was efficient.

### C. CAMMER FACTOR 2: ANALYST COVERAGE

31. The *Cammer* decision stated the following related to analyst coverage:

...it would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely

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<sup>24</sup> For the purposes of this analysis, a "trading week" consists of 5 consecutive trading days (this may not follow the calendar week).

<sup>25</sup> Turnover velocity is simply the average turnover (the first *Cammer* factor) expressed in dollar terms: Turnover Velocity Ratio = (Volume x Price)/(Shares Outstanding x Price) = Dollars Traded/Dollars Outstanding.

<sup>26</sup> Turnover velocity for the NYSE is from World Federation of Exchanges; <http://www.world-exchanges.org/statistics>.

<sup>27</sup> Over the Class Period, the annualized turnover velocity for BP ADSs was even higher, at 212.9%.

reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors.<sup>28</sup>

32. Analyst coverage, while not required for market efficiency in my opinion, is important confirmatory evidence of efficiency. Significant analyst coverage implies that there is sufficient interest in a company and its securities, that there is an active market for information regarding the company and its securities and that the information is widely distributed.

33. During the Class Period, there was an abundance of analyst coverage for BP.

**Exhibit 4** shows that there were at least 330 analyst reports issued during the Class Period by 31 separate equity analysts for BP.<sup>29</sup> Major firms such as Credit Suisse, Deutsche Bank, JP Morgan, and Morgan Stanley issued analyst reports on BP. These reports served the purpose of disseminating publicly available information along with commentary, news, updates, analyses and recommendations of the analysts to investors. In addition, BP's creditworthiness was also evaluated and publicly rated by credit rating agencies.<sup>30</sup> The extensive coverage of BP by securities analysts supports the conclusion that the ADSs traded in an efficient market throughout the Class Period.

34. Since 1989 when the *Cammer* decision was rendered, there has been a tremendous increase of alternative methods by which publicly available information about publicly-traded securities is disseminated to investors. For example, since the *Cammer* decision, through the

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<sup>28</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 22.

<sup>29</sup> This almost certainly understates the total amount of analyst coverage since many analyst reports are not readily available for acquisition.

<sup>30</sup> See Bloomberg CRPR function that identified Moody's, S&P, Fitch and DBRS as all having rated BP during the Class Period. Of note, all of the rating agencies lowered their ratings for BP as the *Deepwater Horizon* matter escalated.

Internet, 24-hour cable news networks, email, RSS feeds,<sup>31</sup> and other media, the ability of individual and institutional investors to obtain information about publicly-traded securities and the market in general has revolutionized the manner in which investors and investment professionals receive and process information.

35. Moreover, information regarding the market price, the current bid-ask spread, and the ability to trade online is available almost instantaneously via the Internet for anyone with an online brokerage account. Thus, in addition to the substantial analyst coverage of BP, there were many other sources of information dissemination. For example, there was substantial public press regarding BP. A search for articles classified as related to BP by the research tool Factiva over the Class Period results in over 48,000 articles.<sup>32</sup> There were 216 SEC filings that were issued and were available online at EDGAR at no out-of-pocket cost.<sup>33</sup> There were numerous other sources of information available throughout the Class Period that I do not attempt to quantify. The degree of news coverage and publicly available information further supports the conclusion that there was substantial supply and demand for information regarding BP in the public arena throughout the Class Period.

36. In summary, the number of analyst reports, other investment reports covering BP and its other publicly-traded securities, and the substantial public dissemination of news and

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<sup>31</sup> RSS is an acronym for Really Simple Syndication or Rich Site Summary. RSS files are formed as XML files and are designed to provide content summaries of news, blogs, forums or website content. The RSS feeds are generally simple headlines and brief descriptions and if the user is interested they can click to see additional information. Content viewed in the RSS reader or news aggregator is known as an RSS feed. RSS is becoming increasingly popular since it is a free and easy way to promote a site and its content without the need to advertise or create complicated content sharing partnerships (<http://www.rss-specifications.com/> and <http://www.rss-specifications.com/what-is-rss.htm>).

<sup>32</sup> Based on an “all-news” search from Factivia for the period November 8, 2011 to May 28, 2010 (*i.e.* the Class Period) with the Company field “BP Plc.”

<sup>33</sup> Excludes SEC Forms 3, 4 and 5, which relate only to equity ownership by directors, officers, and owners of more than ten percent of a class of the company's equity.



other information regarding BP provides evidence of a robust and active market for information about BP and evidence that the ADSs traded in an efficient market.

#### **D. CAMMER FACTOR 3: MARKET MAKERS**

37. The third *Cammer* factor states:

For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption.<sup>34</sup>

38. The basic premise that the number of market makers can serve as an efficiency criteria relates to the notion that market makers are:

...presumably knowledgeable about the issuing company and the stocks' supply and demand conditions (i.e., the "order flow"). Therefore, it is believed the larger the number of market makers in a given security, the more information is available about it and the quicker its dissemination in the price.<sup>35</sup>

39. As noted above, *Cammer* states that the number of market makers is relevant to consider the market efficiency of securities traded in an over-the-counter market with no volume reporting. On such markets, there may be reason for concern regarding liquidity and information dissemination. However, these concerns are generally not applicable to stocks trading on large, modern exchanges such as the NYSE, which are often assumed to be efficient,<sup>36</sup> report volume and trade details, and tend to have rules that virtually guarantee a liquid market.<sup>37</sup>

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<sup>34</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 28.

<sup>35</sup> Brad M. Barber, Paul A. Griffin and Baruch Lev, "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency, *The Journal of Corporation Law*, Winter 1994, 19 Iowa J. Corp. L. 285.

<sup>36</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 2 (citing Bromberg & Lowenfels, *Securities Fraud and Commodities Fraud*, § 8.6 (Aug. 1988)).

<sup>37</sup> For example, there are rules for minimal market capitalization and specialists are *required* to maintain an orderly market. See <http://www.nyse.com/equities/nyseequities/1166830723427.html>; William F. Sharpe, Gordon J. Alexander, Jeffery V. Bailey, *Investments*, Prentice Hall, Fifth Edition, 1995,

40. Throughout the Class Period, the ADSs traded on the NYSE, which is a more advanced and efficient market than an over-the-counter market described for this *Cammer* factor. The NYSE is one of the largest and most liquid security exchanges in the world with billions of shares traded each day. Rather than decentralized market makers providing liquidity for trading (which was the case for the security at issue in *Cammer*), the NYSE conducts trading on a continuous auction system where an assigned specialist is physically present at all times during open trading.<sup>38</sup> These “specialists” are required by exchange rules to maintain a “fair and orderly” market and to take the other side of a trade even if it means having to buy or sell from their own accounts.<sup>39</sup> The specialist system thus provides continuous liquidity for the security. In addition, much of the trading (currently a vast majority) is accomplished by electronically matching orders without the involvement of a specialist or market makers at all.<sup>40</sup>

41. Thus, the NYSE has a market structure that combines both an auction system and electronic trading and does not rely on the less efficient mechanism of decentralized market makers to provide liquidity. Therefore, the number of “market makers” itself is not a relevant metric. However, BP ADSs, by virtue of trading on the NYSE, easily meet the spirit of this *Cammer* factor throughout the Class Period.

#### **E. CAMMER FACTOR 4: SEC FORM S-3 ELIGIBILITY**

42. The fourth *Cammer* factor is SEC Form S-3 Eligibility, which states,

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pp. 45-53; Frank J. Fabozzi, Franco Modigliani, Frank J. Jones, *Foundations of Financial Markets and Institutions*, Prentice Hall, Fourth Edition, 2010, Chapter 18 – Appendix A.

<sup>38</sup> William F. Sharpe, Gordon J. Alexander, Jeffery V. Bailey, *Investments*, Prentice Hall, Fifth Edition, 1995, pp 45-53. Frank J. Fabozzi, Franco Modigliani, Frank J. Jones, *Foundations of Financial Markets and Institutions*, Prentice Hall, Fourth Edition, 2010, Chapter 18 – Appendix A.

<sup>39</sup> Frank J. Fabozzi, Franco Modigliani, Frank J. Jones, *Foundations of Financial Markets and Institutions*, Prentice Hall, Fourth Edition, 2010, Chapter 18 – Appendix A.

<sup>40</sup> Frank J. Fabozzi, Franco Modigliani, Frank J. Jones, *Foundations of Financial Markets and Institutions*, Prentice Hall, Fourth Edition, 2010, Chapter 18 – Appendix A.

[I]t would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency.<sup>41</sup>

43. Through Form S-3 (and Form F-3 with respect to foreign issuers),<sup>42</sup> the SEC allows certain companies that have previously provided sufficiently high levels of public information to incorporate prior SEC filings by reference into current filings and not repeat the information, since it is already deemed to be widely publicly available.<sup>43</sup> In order to be eligible to issue a Form S-3 or Form F-3, among other things, a company 1) must be subject to the Securities Exchange Act of 1934 reporting requirements for more than one year, 2) must have filed all documents in a timely manner for the past twelve months and 3) must show that it has not failed to pay dividends or sinking funds nor defaulted on debts or material leases. Eligibility to file a Form F-3 is confirmatory evidence of efficiency, not a requirement. Interpreted in this way, the standard makes sense as an indicator of efficiency.

44. BP was F-3 eligible and in fact filed Forms F-3 both prior to and during the Class Period (*e.g.* July 27, 2001, February 22, 2002, and November 18, 2008). A Form F-3 allows a company to register unspecified amounts of different specified types of securities using a single form. Throughout the Class Period, I found no evidence that BP failed to file relevant documents in a timely manner, pay dividends, or defaulted on their debts, and therefore remained eligible to file a Form F-3. Therefore, BP meets this *Cammer* efficiency factor which supports the conclusion that the ADSs traded in an efficient market.

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<sup>41</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 22.

<sup>42</sup> <http://www.sec.gov/info/smallbus/secg/s3f3-secg.htm>

<sup>43</sup> For additional information, see [www.sec.gov/about/forms/formf-3.pdf](http://www.sec.gov/about/forms/formf-3.pdf).

## F. CAMMER FACTOR 5: PRICE REACTION TO NEW INFORMATION

45. The fifth *Cammer* factor relates to how a security reacts to new information and states:

...one of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price.<sup>44</sup>

46. Establishing a causal connection between new company-specific news events and movements in the market price is convincing evidence of market efficiency. A technique often relied upon by academics, both inside and outside of the context of litigation, to establish such a causal connection is called the “event study.” An event study is a well-accepted statistical method utilized to isolate the impact of new information on market prices.<sup>45</sup> Indeed, academics used event studies as one tool for evaluating the efficient market hypothesis in the first place. Event studies have now been used for over 30 years and have appeared in hundreds, if not thousands, of academic articles as scientific evidence in evaluating how new information affects securities prices.<sup>46</sup>

47. To analyze cause-and-effect, I performed an event study to determine whether BP’s ADSs reacted swiftly and significantly to new information. Based on the event study I have performed, which explicitly controls for market and industry factors, I find that there is a clear cause-and-effect relationship between new publicly available information about BP and the

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<sup>44</sup> *Cammer v. Bloom*, Civil Action No. 88-2458, U.S. District Court for the District of New Jersey, April 19, 1989, p. 27.

<sup>45</sup> David I. Tabak and Frederick C. Dunbar, “Materiality and Magnitude: Event Studies in the Courtroom,” Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001.

<sup>46</sup> John Binder, “The Event Study Methodology Since 1969,” *Review of Quantitative Finance and Accounting* Vol. 11, 1998, pp. 111-137.

market price of its ADSs after controlling for market effects. I now describe in further detail the event study methodology, the events I test, and the results.

48. An event study is a technique used to measure the effect of new information on the market prices of a company's publicly traded securities. New information may include, for example, company press releases, earnings reports, SEC filings, and news reports or analyst reports. An event study begins by specifying a model of what price movements are "expected" based on outside market factors and then testing whether the deviation from expected price movements is sufficiently large that simple random movement can be rejected as the cause.

49. A well accepted method for performing an event study is to estimate a regression model over some period of time to observe the typical relationship between the market price of the relevant security and broad market factors. I have performed such an analysis where I evaluated the relationship between BP's ADS daily returns (percentage change in price) controlling for S&P 500 Total Return Index ("S&P 500"), a value-weighted peer index ("Peer Index"), and the USD-GBP exchange rate.<sup>47</sup>

50. For each trading day analyzed, I constructed a regression model using data from the prior 120 trading days.<sup>48</sup> This "rolling" regression model allows for the relationship between BP's ADS and the market factors as well as the firm-specific volatility to update over time

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<sup>47</sup> The Peer Index is comprised of companies identified directly from BP's 20-F filings for the years 2007-2010. The peers are Total S.A., Chevron Corp., Royal Dutch Shell PLS, Exxon Mobil Corp., and ConocoPhillips. For Total S.A. and Royal Dutch Shell PLS, which are foreign, I used their ADS prices to avoid non-synchronous trading. BP's earnings announcement dates as well as alleged corrective disclosure dates identified in the Complaint are excluded from the regression's estimation. Plaintiffs' Complaint alleges the following dates as corrective disclosures: 4/26/2010, 4/29/2010, 5/3/2010, 5/10/2010, 5/24/2010, 6/1/2010, 6/9/2010, and 6/14/2010. Because BP pays dividends and conducts substantial business in both USD and GBP, the market price is also sensitive to the USD-GBP exchange rate.

<sup>48</sup> See, A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature*, Vol. 35, No. 1, March 1997, pp. 13-39 ("For example, in an event study using daily data and the market model, the market model parameters could be estimated over the 120 days prior to the event.").

according to the data observed over the most recent 120 trading day (roughly six month) period. Use of a rolling model to account for changing volatility and evolving relationships among market indices is observed in the peer-reviewed literature.<sup>49</sup> I implemented the rolling regression model in this case because, as I will demonstrate later, there is strong evidence that the relationship between BP's ADS returns and the market indices evolved over time and that volatility did not remain constant over the Class Period.

51. The model indicates that there is a positive correlation between BP's ADS and the control variables. For instance, choosing a day in the Class Period purely as an example, December 6, 2007, and looking at the regression results based on the 120 days prior to that day, the estimated coefficient for the S&P 500 is 0.81 which means that a 1% rise in the S&P 500 predicts a 0.81 % increase in BP's ADS return. The estimated coefficient for the Peer Index is 0.57, meaning that the expected return for BP's ADS is about a 0.57% increase for every 1% increase in the Peer Index over and above the return of the S&P 500. Furthermore, the estimated coefficient on the USD-GBP was 0.63. So for every 1% increase in the exchange rate, BP ADSs would be expected to increase 0.63%. **Exhibit 5** plots the estimated coefficients for the rolling regression models for each day during the Class Period.

52. Another important statistic from the regression is the Standard Deviation of the Errors, which measures the degree of imprecision in the predictions from the model. For instance, on the example date, December 6, 2007, the model predicted that absent any new firm-specific information, the price of BP's ADS would increase by 1.41% because the S&P 500 was up 1.51%, the industry index was up an additional 0.2%, and the USD-GBP exchange rate was up 0.07%. Because of the inherent randomness observed in stock price returns, we do not expect

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<sup>49</sup> Phillip A. Braun, Daniel B. Nelson, and Alain M. Sunier, "Good News, Bad News Volatility, and Betas," *Journal of Finance* 50, No. 5, 1995, p. 1597.

the model to predict returns exactly. In this example we observe an actual return of 1.40%. Thus, the “abnormal return” for this day is -0.01% (the actual return of 1.40% minus the predicted return of 1.41%). We then rely on the Standard Deviation of the Errors from the regression model to tell us if this abnormal return of -0.01% is sufficiently large that we reject random movement as the explanation.

53. A “t-statistic” measures the number of standard deviations between the actual observation and the prediction. For the example date, an abnormal return of -0.01% represents -0.02 standard deviations or a t-statistic of -0.02 (abnormal return of -0.01% divided by the Standard Deviation of the Errors of 0.81%). Using the standard assumption that, in the absence of new firm-specific news, abnormal returns will be normally distributed around zero, probability theory implies that based on randomness alone, using a 95% confidence level and large sample size, the abnormal return should only have a t-statistic greater than 1.96 (or less than -1.96) 5% of the time.<sup>50</sup> Stating this point another way, we have 95% confidence that the actual return will fall within 1.96 standard deviations of the predicted return unless there is some non-random explanation. Since our example has a t-statistic of -0.02, we would say that the abnormal return is not statistically significant at the 95% confidence level and we could not reject randomness as the cause with greater than 95% confidence. By contrast, if on a particular day we observe an abnormal return that has a t-statistic of a magnitude greater than 1.96 (statistically significant at the 95% confidence level) and we observe new firm-specific information, we reject randomness as the explanation with 95% confidence and infer that the new information is the cause of the stock price movement.

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<sup>50</sup> David I. Tabak and Frederick C. Dunbar, “Materiality and Magnitude: Event Studies in the Courtroom,” Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001. The financial economics literature often identifies the 90% threshold as a relevant boundary for significance as well.

54. **Exhibit 6** shows that the Standard Deviation of the Errors increased substantially during the middle of the Class Period. The stock market overall experienced a substantial increase in volatility during the middle of the Class Period at the height of the financial crisis and BP was no exception. The standard deviation of errors began to fall as the financial crisis subsided. By adopting the rolling regression model, my event study adjusts for the changing firm-specific volatility as depicted in the **Exhibit 6**.

55. **Exhibit 7** presents the abnormal returns and the threshold for statistical significance for each day during the Class Period. Statistically significant abnormal returns occur when the abnormal return crosses the significance threshold.

56. To analyze cause-and-effect, I examined the price response of BP's ADS to earnings announcements that occurred during the Class Period. There are many academic articles and financial treatises that explain theoretically and demonstrate empirically that release of company earnings announcements often (but not necessarily always) causes a significant change in investors' beliefs regarding the value of a security.<sup>51</sup> Also, newly released earnings reports by the Company are an objective set of news to identify and test. Choosing one earnings report from the Class Period as an example (*i.e.* Q1 2008 results released on April 29, 2008), the price of BP's ADSs had a statistically positive response when the Company reported better than earnings.<sup>52</sup> In response, the market price of BP's ADS increased 4.64%, compared to the

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<sup>51</sup> See, e.g., William H. Beaver "The Information Content of Annual Earnings Announcements," *Empirical Research in Accounting: Selected Studies*, 1968, supplement to the *Journal of Accounting Research*, Vol. 6, 1968, pp. 67-92; Robert G. May, "The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes," *Journal of Accounting Research*, Vol. 9, *Empirical Research in Accounting: Selected Studies* 1971, pp. 119-163; Joseph Aharony and Itzhak Swary, "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance*, Vol. 35, No. 1, March 1980, pp. 1-12.

<sup>52</sup> See, for instance, "Q1 adjusted net income totalled \$6,492m, well above consensus provided by the company (\$5,267m) and our expectations (\$5,268m). The main reasons were a strong recovery for the Refining business which delivered a very positive operating performance (\$640m vs a Q4 07 loss of



predicted return of 0.47%. Thus, the abnormal return on April 29, 2008 was 4.17%. With a t-statistic of 4.41, this abnormal price movement is statistically significant, and I therefore have scientific evidence that BP's ADS reacted rapidly to this new information.

57. Similar to this example, I analyzed the market reaction to BP's other earnings announcements throughout the Class Period. I found statistically significant ADS price movements on a number of these days on which BP reported earnings.<sup>53</sup> In total, of the ten earnings announcements BP issued during the Class Period, six resulted in statistically significant price movements at the 95% confidence level.

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\$1,296m) and a very good showing in Exploration & Production (\$10,448m vs \$9,200m expected). "A good set of results," *Societe Generale*, April 29, 2008.

Also, *see*, "BP's 1Q08 adjusted net income of \$6592m (reported income of \$6588m plus \$4m of non-operating items) came in a full 25% above the company's consensus of \$5.27bn, with results in both E&P and R&M well above consensus. We do not see anything substantial enough in the detail to take away from what is a very strong set of figures, with y/y dollar-EPS growth of 56%." "Clean 1Q figures 25% ahead of consensus – ALERT," *JP Morgan*, April 28, 2008.

<sup>53</sup> I have reviewed the earnings announcements dates and analyst reports around these earnings dates and confirmed that with two exceptions the price movements moved directionally in the manner that one would expect by looking at the earnings dates relative to the expectations alone. The first exception is on July 29, 2008 where BP issued better than expected earnings but BP's ADSs dropped -2.52%. This can be explained by BP's concurrent negative announcements, including concerns of control for BP's joint venture in Russia (i.e. TNK-BP). See, for instance, the following market commentary: "However, BP's shares have been under pressure because of its problems in Russia. The group is facing a bitter battle for control of TNK-BP, its joint venture owned 50-50 with the Alfa-Access-Renova group of Russian billionaires. The shares slipped again yesterday, in spite of the better-than-expected results, and closed down 12¾p at 506¾p."; "Recovering Operating Momentum, But Uncertainty Surrounds TNK," CIBC, July 30, 2008; "BP Hits a Record But Warns of Russia Risk," *Financial Times*, July 29, 2008; "Uncertainty Over TNK Overshadows Record Earnings," *Oppenheimer*, July 31, 2008.

The second exception is with respect to BP's Q1 2010 earnings released on April 27, 2010. Despite better than expected earnings, BP's ADSs were down -2.73% as the market was still reacting to the announcement that efforts to stop the Deep Horizon leak had failed. See, for instance, the following analyst commentary: "The negative share price reaction after exceptional Q1 10 numbers reflects increased concerns from the impact of the Deepwater Horizon incident last week." "Mitigating risks from the GoM," *Morgan Stanley*, April 27, 2010; "Despite the positive earnings surprise, we expect BP shares to remain under pressure due to the ongoing investigation surrounding the Gulf of Mexico rig loss and subsequent oil spill." "First Look: Higher Oil & Gas Prices Lift 1Q10 Earnings Above Consensus," *Oppenheimer*, April 27, 2010; "...concern over the oil spill in the US Gulf of Mexico has overshadowed these strong results." "Excellent 1Q10 results overshadowed by US oil spill," *Daiwa Capital Markets*, April 27, 2010.

58. **Exhibit 8** presents a summary of the earnings announcements and **Exhibits 9A – 9J** charts the intraday price movements for all of these announcement dates. These exhibits illustrate clear price changes on all of the dates even though some of the earnings dates as would be expected did not reach the level of statistical significance.

59. By contrast to the earnings announcement dates, compare these results against the 20 days during the Class Period when a Factiva search identified the least amount of news and there were no analyst reports issued:<sup>54</sup>

TABLE 1. Comparison of Abnormal Returns on Days with the Least Amount of News

Statistic	Earnings Announcement Dates	Days with Least Amount of News and No Analyst Reports
N	10	20 <sup>3</sup>
Significant Days	6	1
% Significant Days	60% <sup>1</sup>	5%
Average Absolute Abnormal Return	2.21% <sup>2</sup>	0.9%
<sup>1</sup> 60% rate of statistical significance is statistically significantly higher than 5% on the basis of a Chi-Square test at the 95% confidence level. <sup>2</sup> 2.21% absolute return is significantly higher than 0.9% based on a test for difference of means at the 95% confidence level. <sup>3</sup> For the purposes of this analysis, we selected the 20 days with no analyst reports and the least amount of news.		

60. Table 1 establishes a strong cause-and-effect relationship between new, unexpected news and rapid changes in BP's ADS. The earnings announcement days have a greater percentage of significant price movements and statistically significantly larger price changes than found on days with the least amount of news. In addition, on days with little news, I only observe a statistically significant price movement on one out of 20 days (or 5%) which is exactly what would be expected based upon randomness alone.

<sup>54</sup> We identified days with the least amount of news via a Factivia search for "all news" with the company field identified as "BP Plc." for the period November 8, 2007 through May 28, 2010. Analyst reports, meanwhile, were obtained through Investext.

61. The event study analysis and intraday charts presented in this section demonstrate a clear cause-and-effect relationship between new material news and changes in the market price of BP's ADS.

#### **G. ADDITIONAL FACTOR 1: MARKET CAPITALIZATION**

62. Thomas and Cotter find that firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."<sup>55</sup> Therefore, market capitalization is another quantifiable measure that is likely correlated with efficiency.

63. BP ADSs had higher market capitalization than the vast majority of NYSE stocks, thus suggesting this factor is supportive of efficiency. During the Class Period, BP had between 864 million and 946 million ADS shares outstanding.

64. Based on the market price, the market capitalization for the BP ADS averaged \$49.5 billion during the Class Period. **Exhibit 10** shows that the ADSs' market capitalization was between the 97<sup>th</sup> and 98<sup>th</sup> percentile of the combined NYSE and NASDAQ markets during the Class Period.<sup>56</sup> In other words, at year-end 2009, the ADSs had a higher market capitalization than at least 98% of the firms on the combined NYSE and NASDAQ. **Exhibit 11** shows BP's ADS market capitalization on a daily basis throughout the Class Period.

65. Given that the market capitalization for BP's ADSs is consistently large relative to other publicly traded companies, this factor is supportive of market efficiency for the ADSs.

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<sup>55</sup> Randall S. Thomas and James F. Cotter, "Measuring Securities Market Efficiency in the Regulatory Setting," *Law and Contemporary Problems*, Vol. 63, p. 117.

<sup>56</sup> The market capitalization of all the companies that were traded in the NYSE and the NASDAQ as of each quarter-end date in the Class Period was acquired from Bloomberg.

## H. ADDITIONAL FACTOR 2: THE BID-ASK SPREAD

66. The bid-ask spread is an important indicator of the degree to which a market is developed. The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price. In addition, the wider the bid-ask spread, the more costly it is to arbitrage away small inefficiencies. Thus, the narrower the bid-ask spread, the greater indication of an efficient market.

67. I analyzed bid-ask spreads for BP's ADSs during the Class Period. During this period, the time-weighted bid-ask spread for BP ADSs in each month ranged from 0.014% to 0.026%.<sup>57</sup> When compared against a random sample of 100 other stocks on the NYSE and NASDAQ in October 2008 (*i.e.* the month BP's ADSs had their highest bid-ask spread), BP's ADSs still had the 2<sup>nd</sup> lowest bid-ask spread overall.<sup>58, 59</sup> Accordingly, this analysis suggests that BP's ADSs bid-ask spread compares favorably with other common stocks and further supports a conclusion of market efficiency.

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<sup>57</sup> I calculated a time-weighted average bid-ask spread for BP ADSs for each month from November 2008 to May 2010 using data received from TICK database. See [www.tickdata.com](http://www.tickdata.com). November 2008 and May 2010 data are limited to the Class Period.

<sup>58</sup> Quote data for BP and other publicly traded stocks were obtained from the TICK database. See [www.tickdata.com](http://www.tickdata.com).

<sup>59</sup> The average bid-ask spread was calculated by taking a time-weighted average of the spread during trading hours on the primary exchange of each security. Spread is calculated as the difference between the bid price and ask price divided by the midpoint of the bid-ask spread. I calculated the National Best Bid and Offer using the data filtering procedures described in Roger D. Huang, Hans R. Stall, "Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE," *Journal of Financial Economics* Vol. 41, 1996, pp. 313-357.

### **I. ADDITIONAL FACTOR 3: INSTITUTIONAL OWNERSHIP**

68. Institutional investors are considered to be sophisticated and well-informed with access to most publicly available information for the stocks that they own. These investors include mutual funds, pension funds, investment banks and other types of large financial institutions that have substantial resources to analyze the securities they purchase for their portfolios. Most institutions that hold over \$100 million in assets are required to report their equity holdings on a quarterly basis on SEC Form 13F.<sup>60</sup> As **Exhibit 12** shows, these large institutions reported owning, on average, 41% of BP ADSs during the Class Period. This high level of institutional ownership of BP ADSs during the Class Period, coupled with the high trading volume, indicates that the market price was reflective of active trading by extremely sophisticated and knowledgeable investors and supports a conclusion of market efficiency. Furthermore, **Exhibit 12** shows insiders consistently held less than 1% of the ADSs.

### **J. ADDITIONAL FACTOR 4: AUTOCORRELATION**

69. If previous price movements of a security have the ability to predict future price movements, then it is said to be “autocorrelated.” Autocorrelation is relevant to efficiency because if the autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it suggests market inefficiency because past price movements are not fully reflected in the current price.

70. Autocorrelation may occur from time to time for random reasons or due to the pattern of firm-specific news. Efficiency would only be violated, however, if the autocorrelation

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<sup>60</sup> See <http://www.sec.gov/about/forms/form13f.pdf>.

were large enough and persistent enough that a trader could consistently earn riskless profits over time.<sup>61</sup>

71. A well-accepted methodology to test for the existence of autocorrelation is to run a regression analysis that tests whether, on average, the abnormal return from the previous day has a statistically significant effect on the abnormal return today.<sup>62</sup> If the previous day's abnormal return has no statistically significant predictive power, then there is no evidence of autocorrelation. Even if the regression shows a significant result for a certain period, then one must ask whether the effect is persistently significant and large enough to suggest a predictable arbitrage opportunity in the next period.

72. **Exhibit 13** displays the autocorrelation coefficient for BP ADSs using the abnormal returns from the event study model described above. The coefficient for the entire Class Period is not significant at the 95% level and displays no discernible pattern over time across quarters. This is inconsistent with the notion that an investor could consistently predict abnormal movements and earn arbitrage profits. Therefore, this factor also supports the conclusion that BP ADSs traded in an efficient market throughout the Class Period.

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<sup>61</sup> Doron Avramov, Tarun Chordia, and Amit Goyal, "Liquidity and Autocorrelations in Individual Stock Returns," *The Journal of Finance*, Vol. LXI, No. 5, 2006, pp. 2367-2368; Michael C. Jensen, "Some Anomalous Evidence Regarding Market Efficiency," *Journal of Financial Economics* Vol. 6, Nos. 2/3, 1978, pp. 95-101.

<sup>62</sup> William H. Greene, *Econometric Analysis*, Prentice Hall, Sixth Edition, 2008, Chapter 19, p. 644.

## VIII. OTHER ITEMS (OPTION TRADERS, LACK OF ARBITRAGE AND CLASS WIDE DAMAGES)

### Options:

73. In addition to the factors analyzed in **Section VII**, there was also considerable trading in BP ADS Options during the Class Period.<sup>63</sup> Academic articles have demonstrated that options written on existing assets can improve efficiency by permitting an expansion of the contingencies that are covered by the market.<sup>64</sup> Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.<sup>65</sup>

### Lack of Arbitrage Opportunity:

74. Throughout the Class Period BP's common stock and their underlying ADSs traded on the London Stock Exchange and NYSE stock exchange respectively. In an efficient market, one would expect related securities such as these to move in tandem in the marketplace after taking into account the conversion ratio and exchange rate. If, by contrast, the securities did not trade in tandem than there would opportunities for arbitrage. Arbitrage is defined as the "exploitation of security mispricing in such a way that risk-free economic profits may be earned." It involves the simultaneous purchase and sale of equivalent securities in order to profit from discrepancies in their price relationship.<sup>66</sup> As shown in **Exhibit 14**, however, it is quite

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<sup>63</sup> For instance, according to Bloomberg there were 3.6 million BP ADS put contracts and 9.1 million BP ADS call contracts that traded during the Class Period.

<sup>64</sup> Stephen A. Ross, "Options and Efficiency," *The Quarterly Journal of Economics*, Vol. 90, February 1997, pp. 75-89.

<sup>65</sup> Raman Kumar, Atulya Sarin and Kuldeep Shastri, "The Impact of Options Trading on the Market Quality of the Underlying Security: An Empirical Analysis," *The Journal of Finance*, Vol. LIII, No. 2, April 1998, pp. 717-732.

<sup>66</sup> Bodie, Zvi, Kane, Alex, Marcus J. Alan, *Investments*, 4<sup>th</sup> ed. (Irwin McGraw-Hill, 1999), p. 307.

clear that there was very little divergence between BP's ADSs and its underlying Common Stock. Any small differences are likely explained by the time difference between trading in New York and London. This further supports my view that BP's ADSs traded in an efficient market.

**Class-Wide Damages:**

75. Class-wide damages in this matter can be calculated using a common methodology. The methodology and evidence for establishing the inflation per share in the market price on each day during the class period is common to the class. In particular, plaintiffs would seek to quantify harm to class members by performing event study analysis to link declines in the stock price to revelation of corrective information. Damages for each class member can then be calculated based upon a common formula (*e.g.* inflation at time of purchase less inflation at time of sale).

**IX. CONCLUSION**

76. In sum, every factor analyzed supports my opinion that BP's ADSs traded in an efficient market. Furthermore, class-wide damages in this matter can be calculated using a common methodology.

77. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on June 14, 2013.

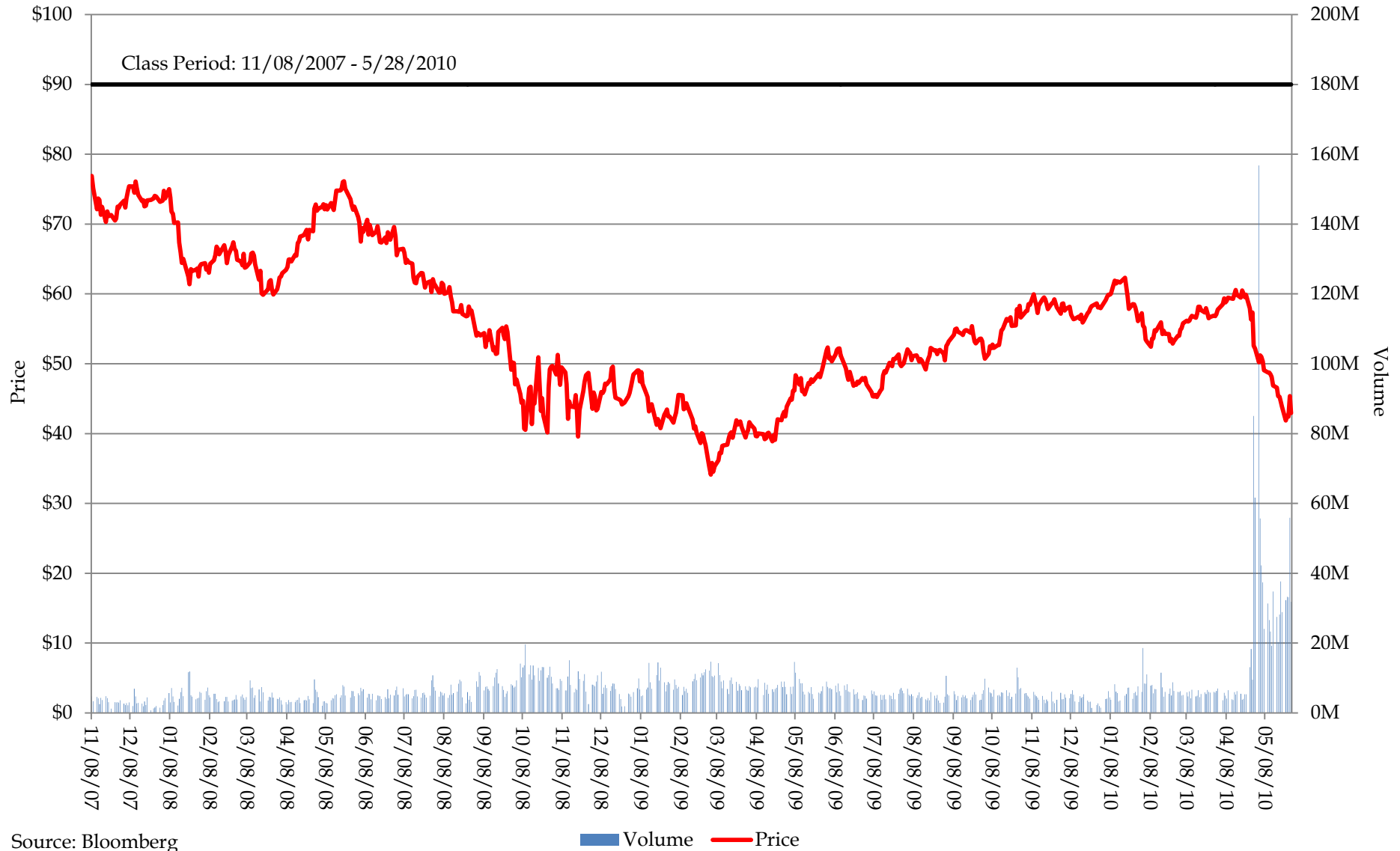
  
Chad Coffman



**Exhibit 1****Summary of Efficiency Factors for BP American Depositary Shares (ADS)**

Factor	Summary of Factor	BP ADS
Average Weekly Trading Volume Cammer I	"Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for a security is an efficient one; 1% would justify a substantial presumption."	<ul style="list-style-type: none"> <li>The average weekly trading volume of 4.08%, as a percentage of ADSs outstanding, well exceeds the standard of 2% that courts have suggested would justify a strong presumption of an efficient market (Note: 7.4 million ADSs traded daily on average during the Class Period).</li> </ul>
Analyst Coverage Cammer II	"...it would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors."	<ul style="list-style-type: none"> <li>During the Class Period at least 31 securities analysts issued 330 analyst reports, which implies that important information relevant to trading BP's ADSs was widely communicated to the market.</li> </ul>
Market Makers Cammer III	"For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption."	<ul style="list-style-type: none"> <li>Because BP's ADSs were exchange-traded on the NYSE, not over the counter, this factor is satisfied.</li> </ul>
SEC Form S-3 Eligibility Cammer IV	"It would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency."	<ul style="list-style-type: none"> <li>BP was F-3 eligible (i.e. the S-3 equivalent for foreign companies) as they filed Forms F-3 on 7/27/2001, 2/22/2002, and 11/18/2008; therefore, this factor is satisfied.</li> </ul>
Price Reaction to New Information Cammer V	"...one of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price."	<ul style="list-style-type: none"> <li>The event study demonstrates a clear cause and effect relationship. A statistical test shows a significant contemporaneous relationship between new firm-specific news and significant changes in the market price of BP's ADSs.</li> </ul>
Market Capitalization	Firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."	<ul style="list-style-type: none"> <li>As of 12/31/2008 and 12/31/2009, BP's market capitalization was \$42B and \$50B respectively which is at or above the 97th percentile of NYSE and NASDAQ stocks. BP's ADSs therefore easily meets this criteria.</li> <li>Insiders held as much as 1% of the ADSs outstanding.</li> </ul>
Bid-Ask Spread	The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price.	<ul style="list-style-type: none"> <li>Based on a random sample of 100 stocks that traded on the NYSE and NASDAQ, BP's ADSs had the 2nd smallest bid-ask spread. This supports a finding of efficiency.</li> </ul>
Institutional Holdings	Institutional investors are considered to be sophisticated, well-informed investors with access to most publicly available information for the stocks that they own.	<ul style="list-style-type: none"> <li>Institutions held at least 39% of the shares outstanding, which further supports finding that BP's ADSs traded in an efficient market (Note: Institutions held a max of 44% of the shares outstanding and an average of 41% shares outstanding during the Class Period).</li> </ul>
Autocorrelation	If autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it suggests market inefficiency because past price movements are not fully reflected in the current price.	<ul style="list-style-type: none"> <li>No evidence of consistent autocorrelation, which means that there was no systematic opportunity for a trader to profit from trading BP's ADSs based solely on its past price movements.</li> </ul>

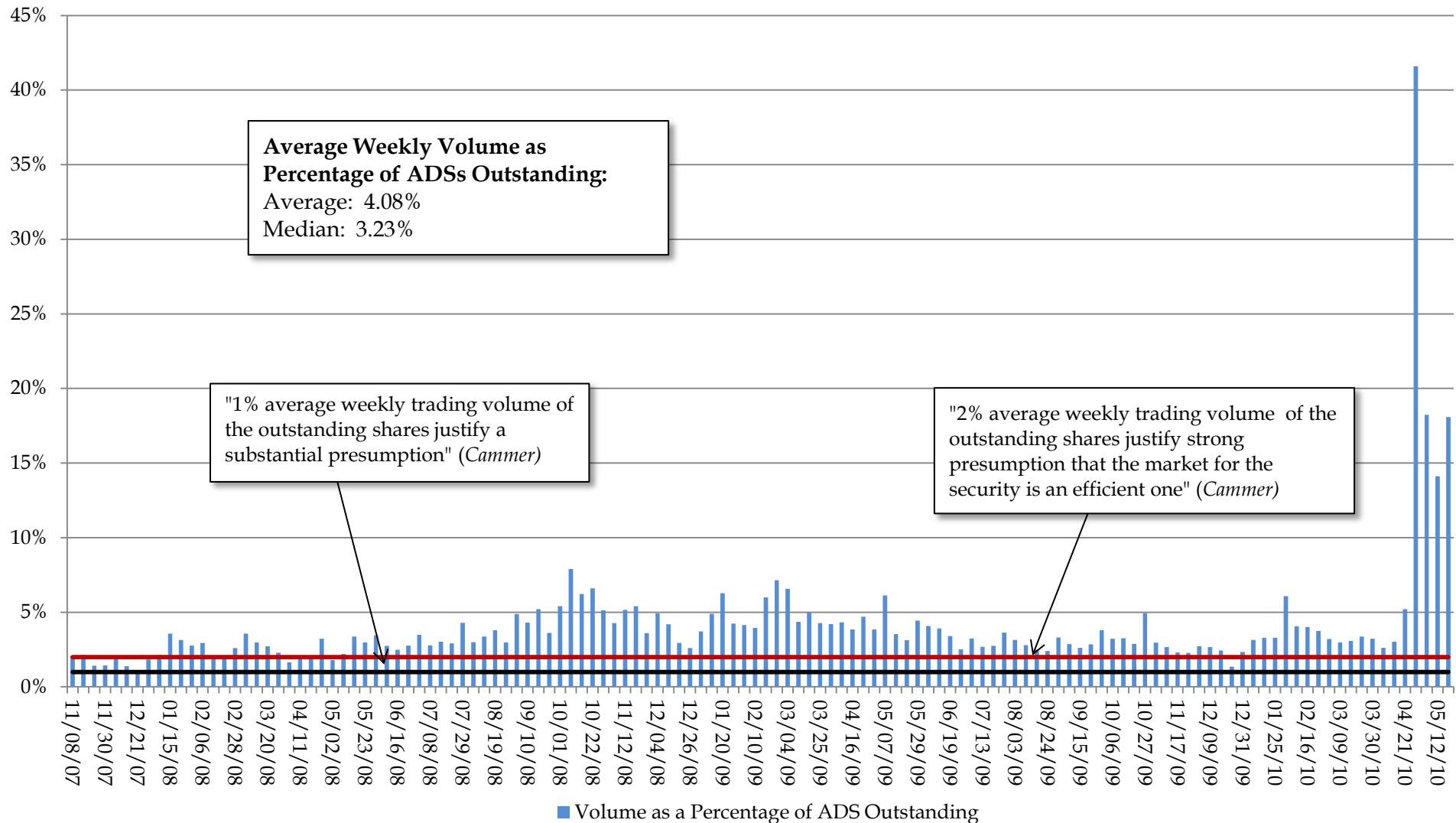
**Exhibit 2**  
**BP ADS Closing Price & Volume**  
**11/8/2007 - 5/28/2010**



Note: Prices are not adjusted for dividends.

## Exhibit 3

# BP ADS Average Weekly Trading Volume as a Percentage of Shares Outstanding 11/08/2007 - 5/25/2010



Sources: (1) Amount of ADS outstanding based on BP Forms 20-F for fiscal year end 12/31/2006, 12/31/2007, 12/31/2008, and 12/31/2009. Forms 20-F are issued once per year, therefore, ADS outstanding are carried forward until the next filing. (2) Daily trading volume data is from Bloomberg.

Note: Average weekly turnover is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on November 8, 2007. The last week of the Class Period consists of only three trading days and is thus excluded from the "Average Weekly Volume as Percentage of Shares Outstanding" calculation and from the chart.

**Exhibit 4**  
**BP ADS Summary of Securities Analyst Reports Issued**  
**During the Class Period**

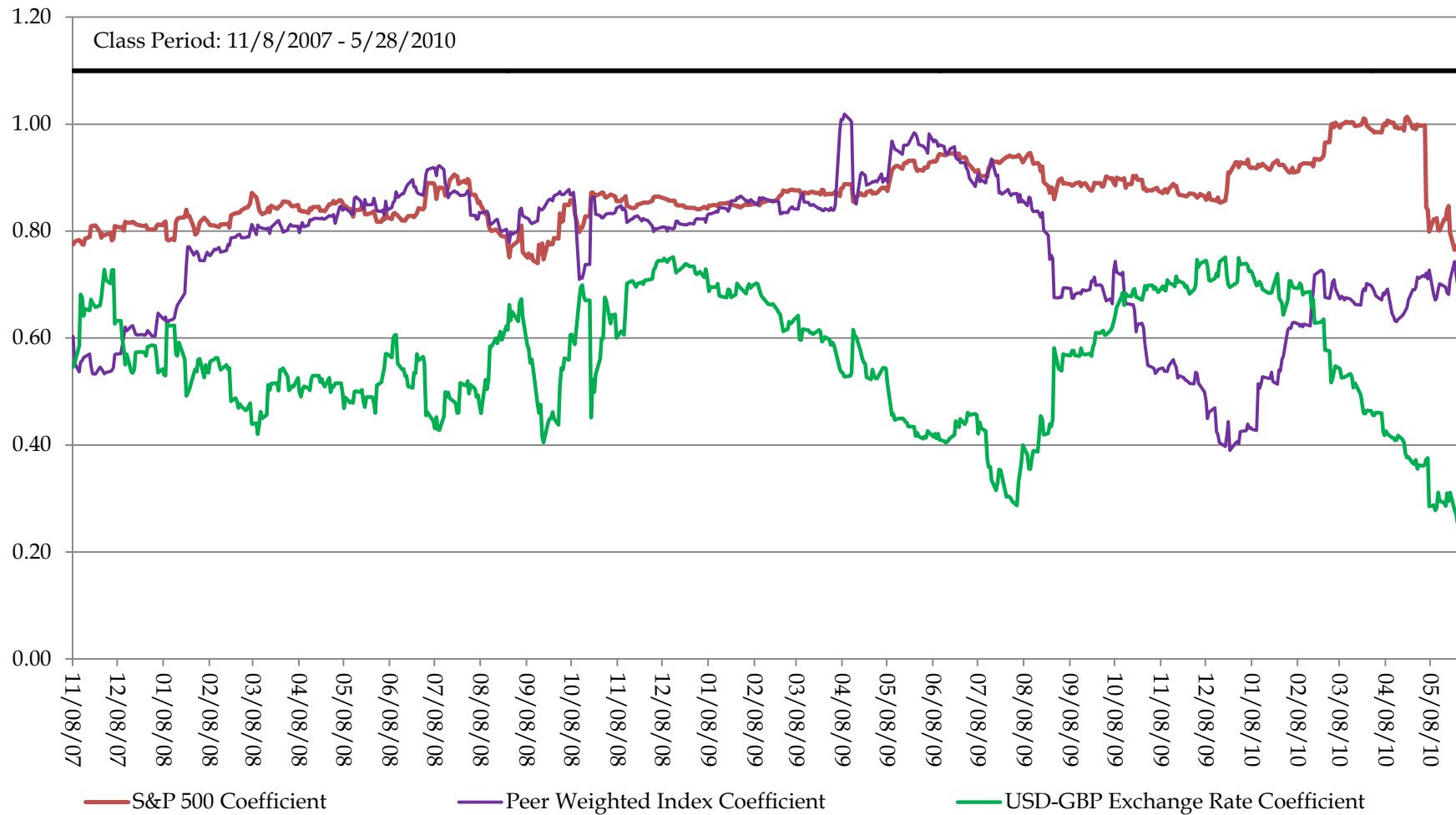
<b>Analyst Name</b>	<b>Reports Issued</b>
[1] ARBUTHNOT SECURITIES LIMITED	1
[2] ARGUS INSTITUTIONAL PARTNERS	6
[3] BANCA IMI	1
[4] BEAR STEARNS AND CO INC	5
[5] CA CHEUVREUX	30
[6] CHARLES STANLEY & CO., LTD.	12
[7] CIBC WORLD MARKETS INC.	3
[8] COLLINS STEWART	5
[9] CREDIT SUISSE	17
[10] DAIWA CAP MKTS	8
[11] DEUTSCHE BANK SECURITIES LTD.	24
[12] DNB NOR MARKETS	18
[13] DOLMEN SECURITIES	1
[14] ESN/NCB STOCKBROKERS	1
[15] EVOLUTION SECURITIES	6
[16] HSBC GLOBAL RESEARCH	16
[17] IIR GROUP	17
[18] ING BANK N.V	8
[19] JPMORGAN	26
[20] KEPLER CAPITAL MARKETS	5
[21] MACQUARIE RESEARCH	17
[22] MORGAN STANLEY	18
[23] NATIXIS	17
[24] OPPENHEIMER AND CO	22
[25] ORIEL SECURITIES	1
[26] RAYMOND JAMES	2
[27] RBS	5
[28] SEYMOUR PIERCE LTD	2
[29] SOCIETE GENERALE	31
[30] THE BENCHMARK COMPANY LLC	2
[31] UNICREDIT RESEARCH	3
<b>Total</b>	<b>330</b>

Source: Investext.

Note: The Class Period is from 11/08/2007 to 05/28/2010.

**Exhibit 5**

**BP ADS Regression Model: S&P 500, Peer Weighted Index and USD-GBP Exchange Rate  
Coefficients  
11/8/2007 - 5/28/2010**

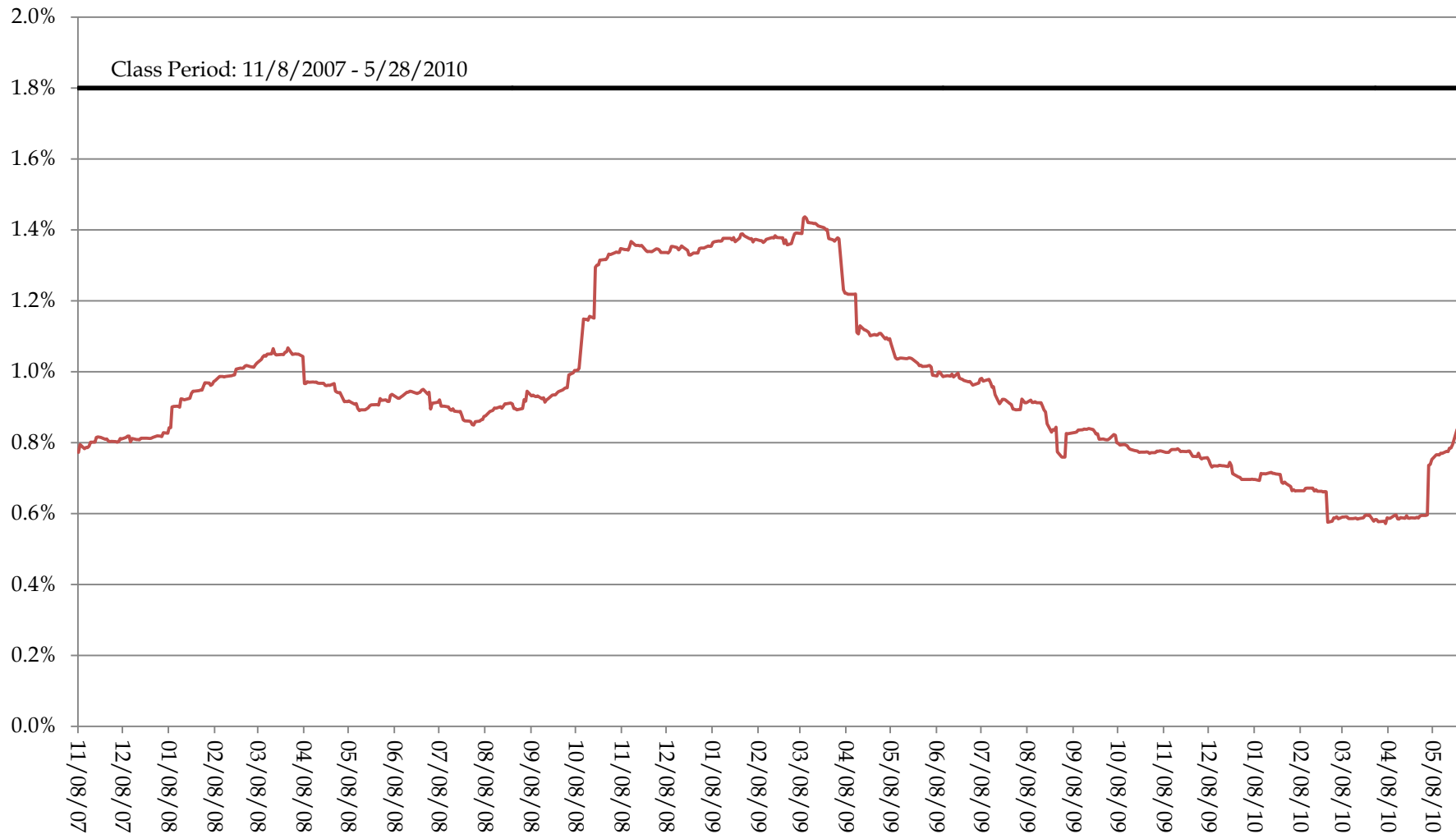


Source: Bloomberg.

Notes: For each trading day I rely upon a regression using data from the prior 120 trading days. This rolling regression model estimates the relationship between BP's ADSs returns with the returns of the S&P 500, a value-weighted peer index, and the USD-GBP exchange rate. For the peer index, I used the following firms identified in the BP's 2007-2010 20-F filings: Total S.A. (ADR), Chevron Corp., Royal Dutch Shell PLS (ADR), Exxon Mobil Corp., and ConocoPhillips. BP's earnings dates and corrective disclosure dates alleged in the Complaint are excluded from the regression. Plaintiffs' Complaint alleges the following dates as corrective disclosures: 4/26/2010, 4/29/2010, 5/3/2010, 5/10/2010, 5/24/2010, 6/1/2010, 6/9/2010, and 6/14/2010.

**Exhibit 6**

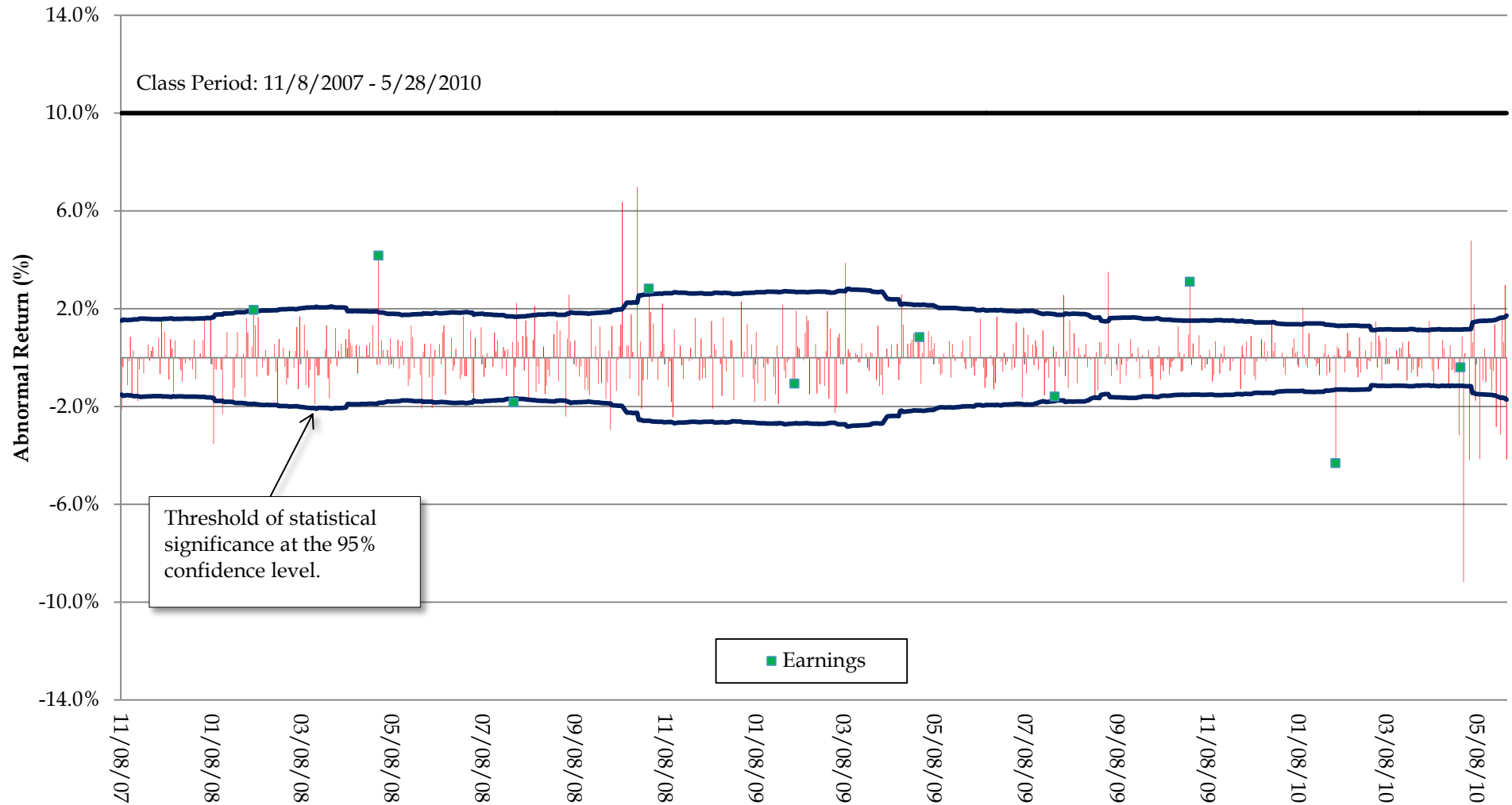
**BP ADS Regression Model: Standard Deviation of The Errors  
11/8/2007 - 5/28/2010**



Source: Bloomberg.

Notes: For each trading day I rely upon a regression using data from the prior 120 trading days. This rolling regression model estimates the relationship between BP's ADSs returns with the returns of the S&P 500, a value-weighted peer index, and the USD-GBP exchange rate. For the peer index, I used the following firms identified in the BP's 2007-2010 20-F filings: Total S.A. (ADR), Chevron Corp., Royal Dutch Shell PLS (ADR), Exxon Mobil Corp., and ConocoPhillips. BP's earnings dates and corrective disclosure dates alleged in the Complaint are excluded from the regression. Plaintiffs' Complaint alleges the following dates as corrective disclosures: 4/26/2010, 4/29/2010, 5/3/2010, 5/10/2010, 5/24/2010, 6/1/2010, 6/9/2010, and 6/14/2010.

**Exhibit 7**  
**BP ADS Regression Model: Abnormal Returns**  
**11/8/2007 - 5/28/2010**



Source: Bloomberg.

Notes: For each trading day I rely upon a regression using data from the prior 120 trading days. This rolling regression model estimates the relationship between BP's ADSs returns with the returns of the S&P 500, a value-weighted peer index, and the USD-GBP exchange rate. For the peer index, I used the following firms identified in the BP's 2007-2010 20-F filings: Total S.A. (ADR), Chevron Corp., Royal Dutch Shell PLS (ADR), Exxon Mobil Corp., and ConocoPhillips. BP's earnings dates and corrective disclosure dates alleged in the Complaint are excluded from the regression. Plaintiffs' Complaint alleges the following dates as corrective disclosures: 4/26/2010, 4/29/2010, 5/3/2010, 5/10/2010, 5/24/2010, 6/1/2010, 6/9/2010, and 6/14/2010. 95% confidence interval is based on Student's t-distribution.

**Exhibit 8**  
**Event Study Analysis of BP Earnings Dates**

#	Date	Time	Market Date	Event	Headline	ADS Price	ADS Return	Abnormal Return	Abnormal Dollar Change	T-Stat	Sig Level
1	2/5/2008	2:02 AM	2/5/2008	Earnings Announcement	BP 4Q Underlying Profit \$2.97 B ( <i>Dow Jones International News</i> , 2:02 AM)	\$63.48	-1.44%	1.95%	\$1.09	2.03	**
2	4/29/2008	2:02 AM	4/29/2008	Earnings Announcement	BP 1Q Net Pft \$7.6B ( <i>Dow Jones International News</i> , 2:02 AM)	\$72.18	4.64%	4.17%	\$2.54	4.41	**
3	7/29/2008	2:03 AM	7/29/2008	Earnings Announcement	BP 2Q Net Pft \$9.5B ( <i>Dow Jones International News</i> , 2:03 AM)	\$60.24	-2.52%	-1.83%	-\$1.01	-2.14	**
4	10/28/2008	3:08 AM	10/28/2008	Earnings Announcement	BRIEF-BP Q3 profit up 148 pct at \$10 bln on high oil ( <i>Dow Jones International News</i> , 3:08 AM)	\$46.52	15.87%	2.81%	\$1.02	2.14	**
5	2/3/2009	2:07 AM	2/3/2009	Earnings Announcement	BP: 4Q Includes \$700M TNK-BP Loss On Excise Duty, Impairments ( <i>Dow Jones International News</i> , 2:07 AM)	\$42.29	1.73%	-1.07%	-\$0.41	-0.77	
6	4/28/2009	2:01 AM	4/28/2009	Earnings Announcement	BP 1Q Replacement Cost Profit \$2.39Bln ( <i>Dow Jones International News</i> , 2:01 AM)	\$42.62	1.67%	0.84%	\$0.33	0.76	
7	7/28/2009	2:02 AM	7/28/2009	Earnings Announcement	BP Q2 net profit down 53 percent to 4.39 billion dollars (Agence France-Presse, 2:42 AM)	\$50.00	-2.61%	-1.60%	-\$0.79	-1.77	
8	10/27/2009	6:31 AM	10/27/2009	Earnings Announcement	BP Q3 Profit Down By a Third But Tops Forecasts ( <i>Associated Press</i> , 6:31 AM)	\$57.82	4.22%	3.10%	\$1.67	4.00	**
9	2/2/2010	2:00 AM	2/2/2010	Earnings Announcement	BP PLC 4Q Net Pft \$4.29B ( <i>Dow Jones International News</i> , 2:00 AM)	\$55.46	-3.09%	-4.32%	-\$2.44	-6.51	**
10	4/27/2010	4:05 AM	4/27/2010	Earnings Announcement	BP Q1 Profit More Than Doubles on the Year ( <i>Associated Press</i> , 4:05 AM)	\$56.33	-2.73%	-0.41%	-\$0.23	-0.69	
11	7/27/2010	2:17 AM	7/27/2010	Earnings Announcement	BP Makes \$17B 2Q Net Loss On Gulf Oil Spill Costs ( <i>Dow Jones Newswire</i> , 2:17 AM)	\$38.00	-1.68%	-2.91%	-\$1.13	-1.25	

\*\* Denotes statistical Significance at the 95% confidence level or greater.

Source: Bloomberg

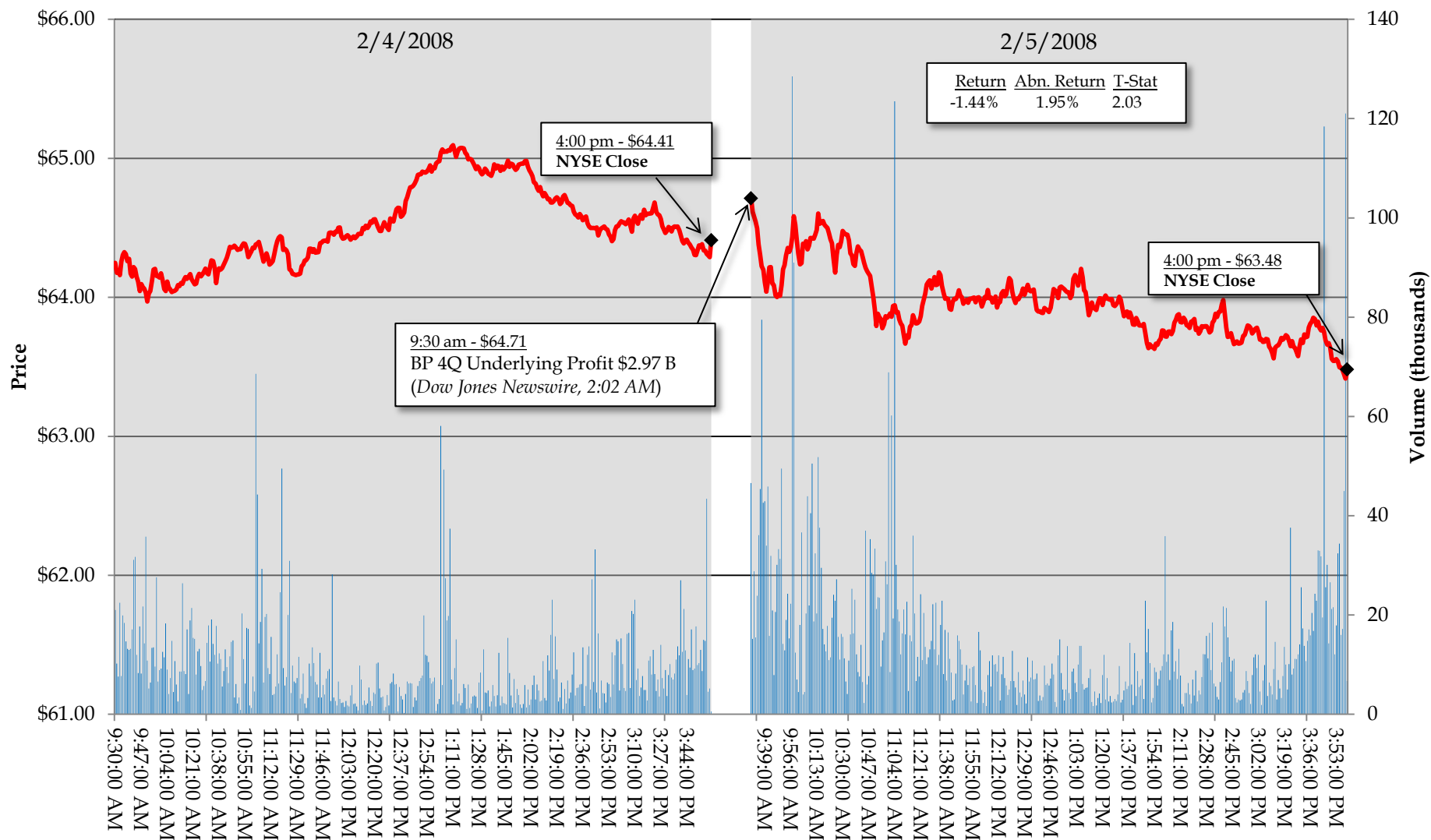
Notes:

1) For each trading day I rely upon a regression using data from the prior 120 trading days. This rolling regression model estimates the relationship between BP's ADSs returns with the returns of the S&P 500, a value-weighted peer index, and the USD-GBP exchange rate. For the peer index, I used the following firms identified in the BP's 2007-2010 20-F filings: Total S.A. (ADR), Chevron Corp., Royal Dutch Shell PLS (ADR), Exxon Mobil Corp., and ConocoPhillips. BP's earnings dates and corrective disclosure dates alleged in the Complaint are excluded from the regression. Plaintiffs' Complaint alleges the following dates as corrective disclosures: 4/26/2010, 4/29/2010, 5/3/2010, 5/10/2010, 5/24/2010, 6/1/2010, 6/9/2010, and 6/14/2010. 95% confidence interval is based on Student's t-distribution.

2) I have reviewed the earnings announcements dates and analyst reports around these earnings dates and confirmed that with two exceptions the price movements moved directionally in the manner that one would expect. The first exception is with respect to BP's Q2 2008 earnings released on July 29, 2008. Despite these record earnings, that also beat consensus estimates, BP's ADSs dropped -2.52% over concerns of control for BP's joint venture in Russia (i.e. TNK-BP). The second exception is with respect to BP's Q1 2010 earnings released on April 27, 2010. Despite solid earnings, BP's ADSs were down -2.73% as the market was still reacting to the day's prior announcement that efforts to stop the leak had failed.



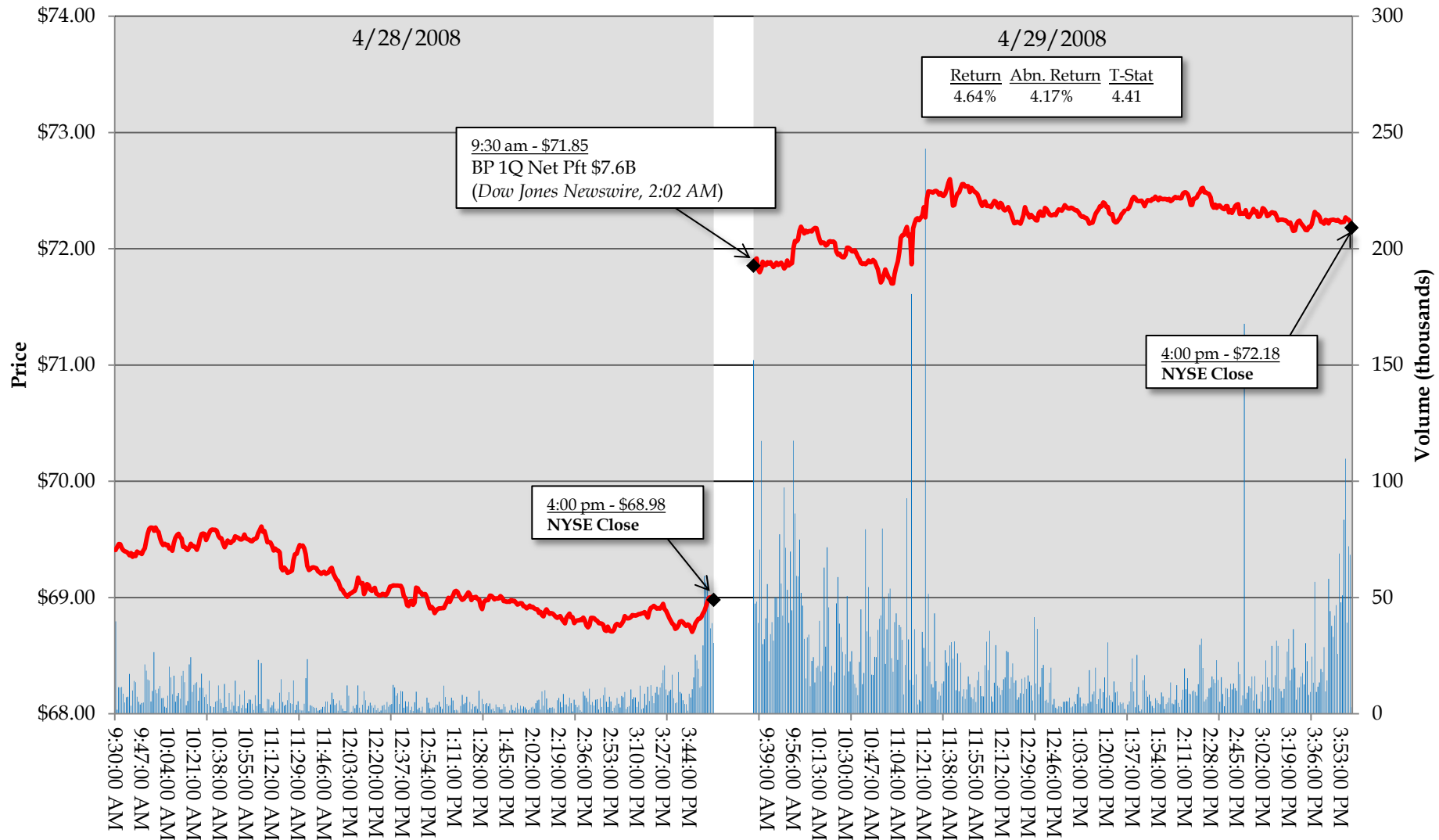
**Exhibit 9A**  
**BP Intraday ADS Price and Volume**  
**2/4/2008 - 2/5/2008 (Q4 FY 2007 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

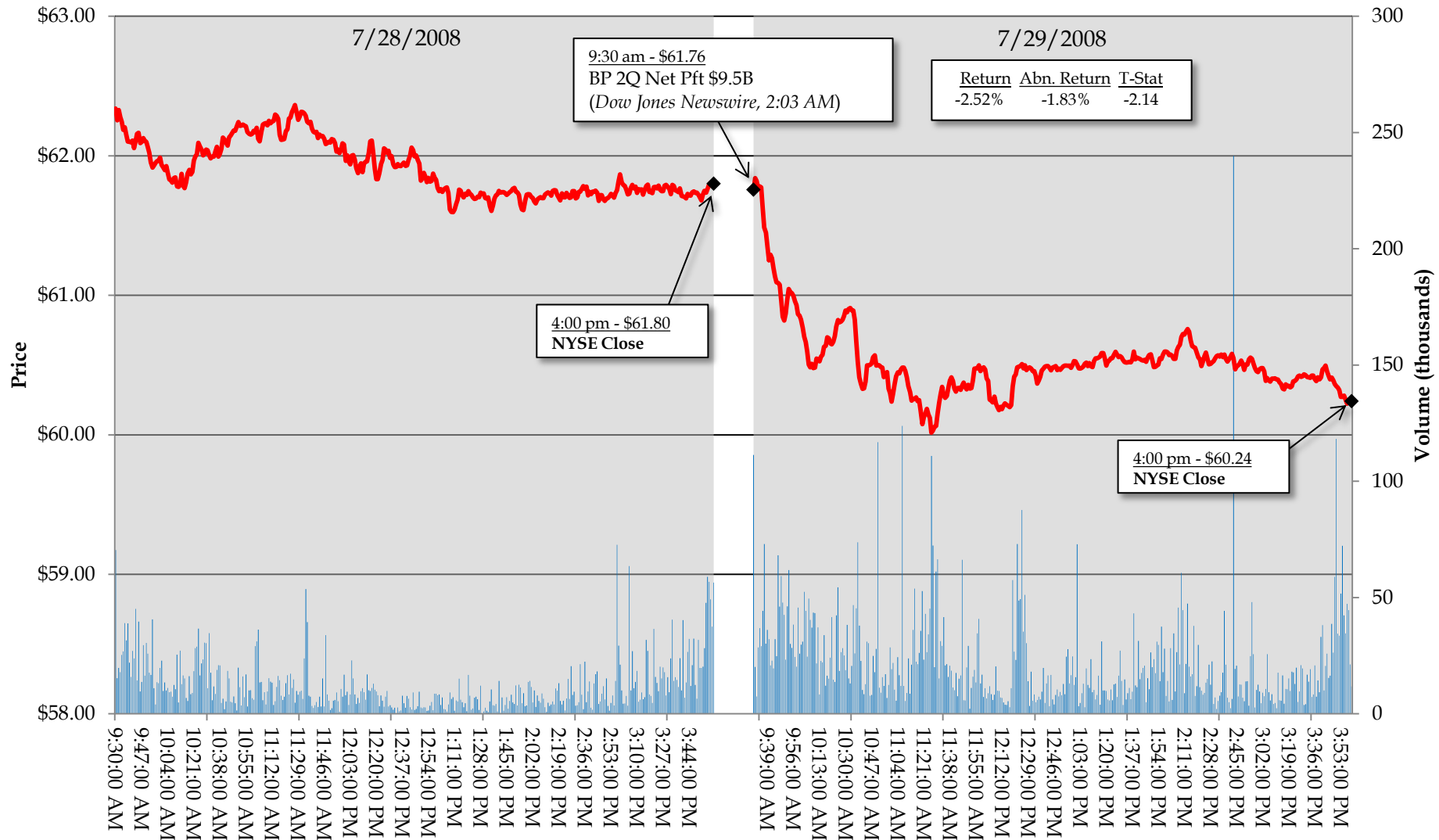
**Exhibit 9B**  
**BP Intraday ADS Price and Volume**  
**4/28/2008 - 4/29/2008 (Q1 FY 2008 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

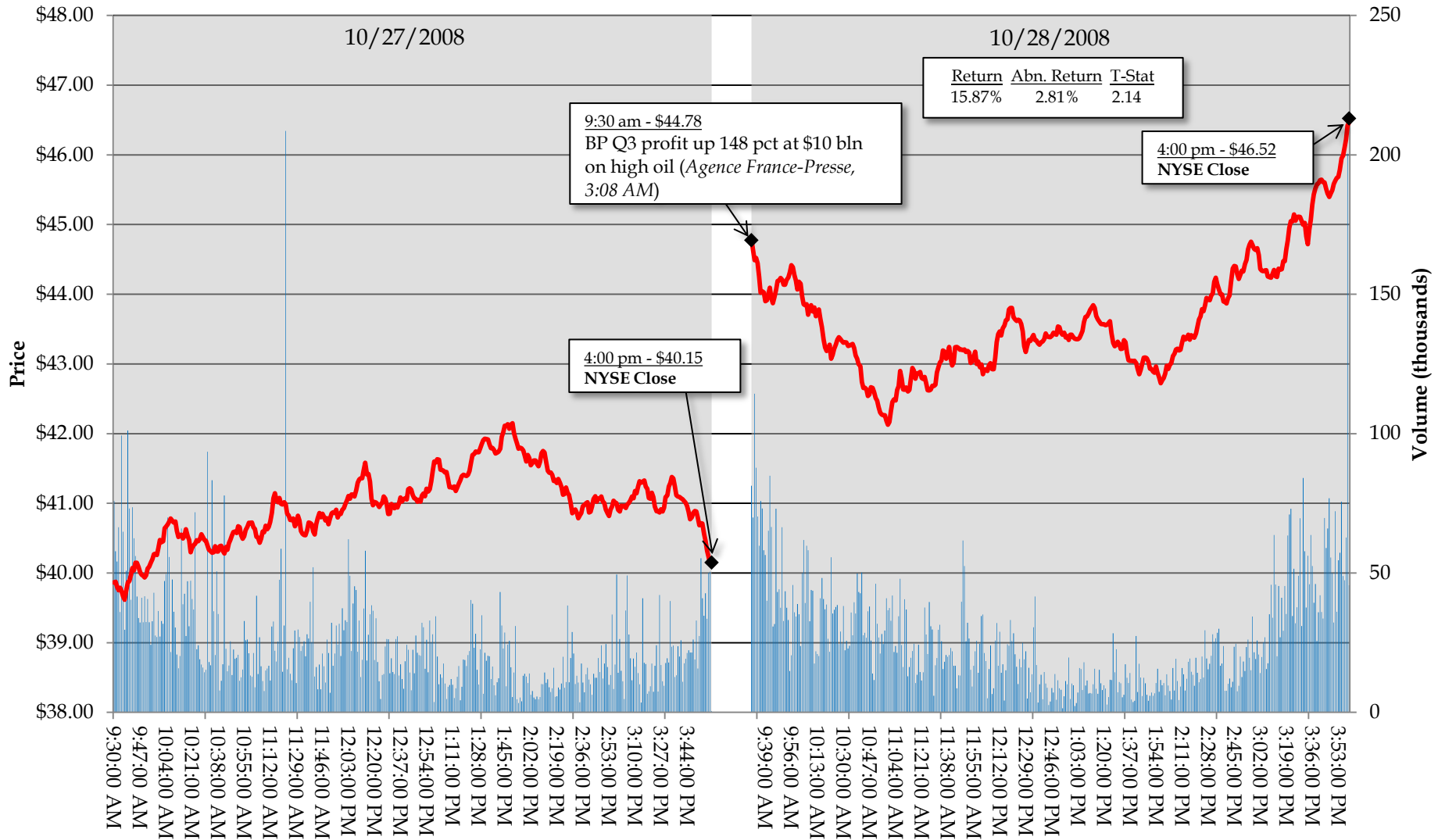
**Exhibit 9C**  
**BP Intraday ADS Price and Volume**  
**7/28/2008 - 7/29/2008 (Q2 FY 2008 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

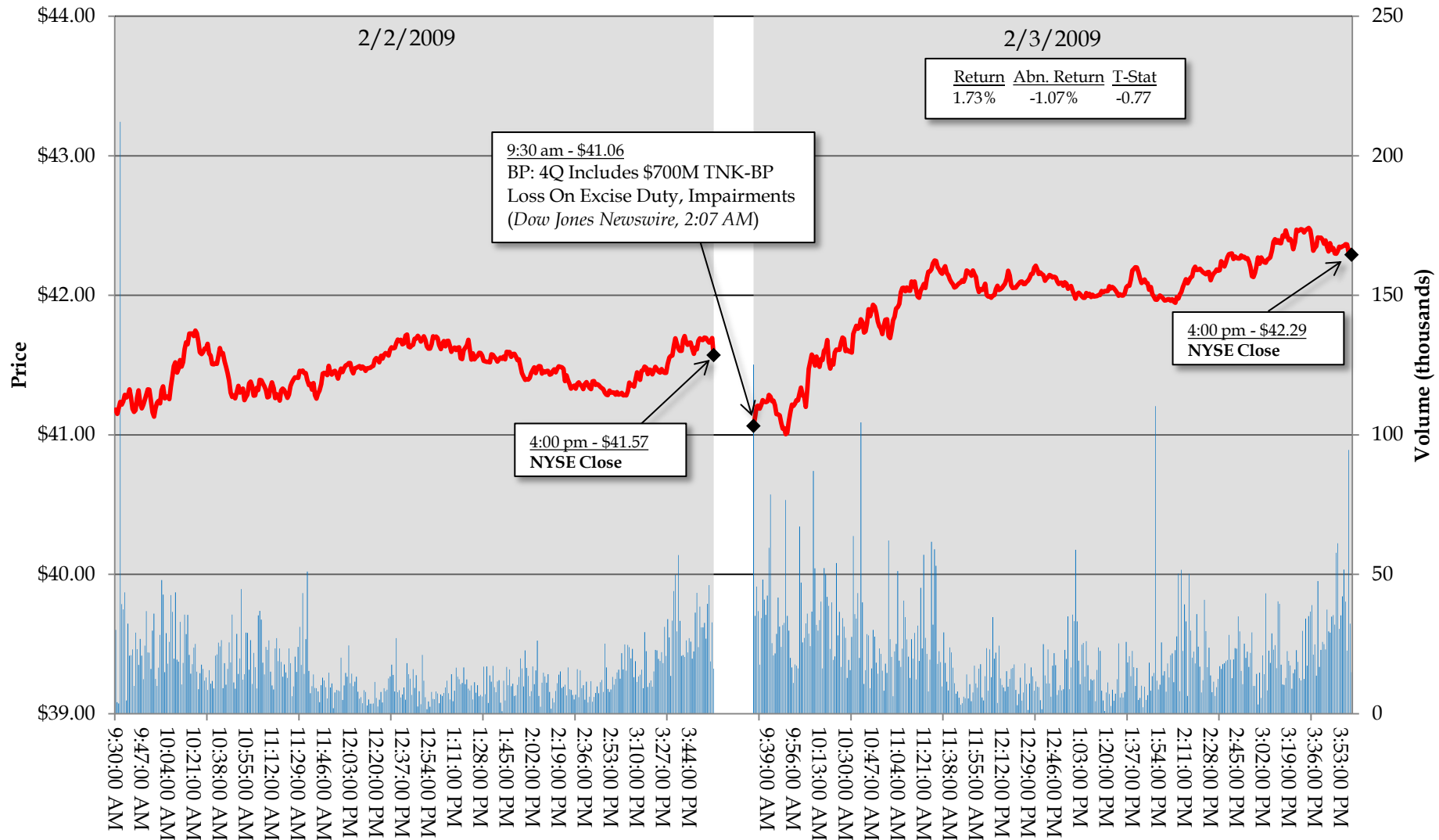
**Exhibit 9D**  
**BP Intraday ADS Price and Volume**  
**10/27/2008 - 10/28/2008 (Q3 FY 2008 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

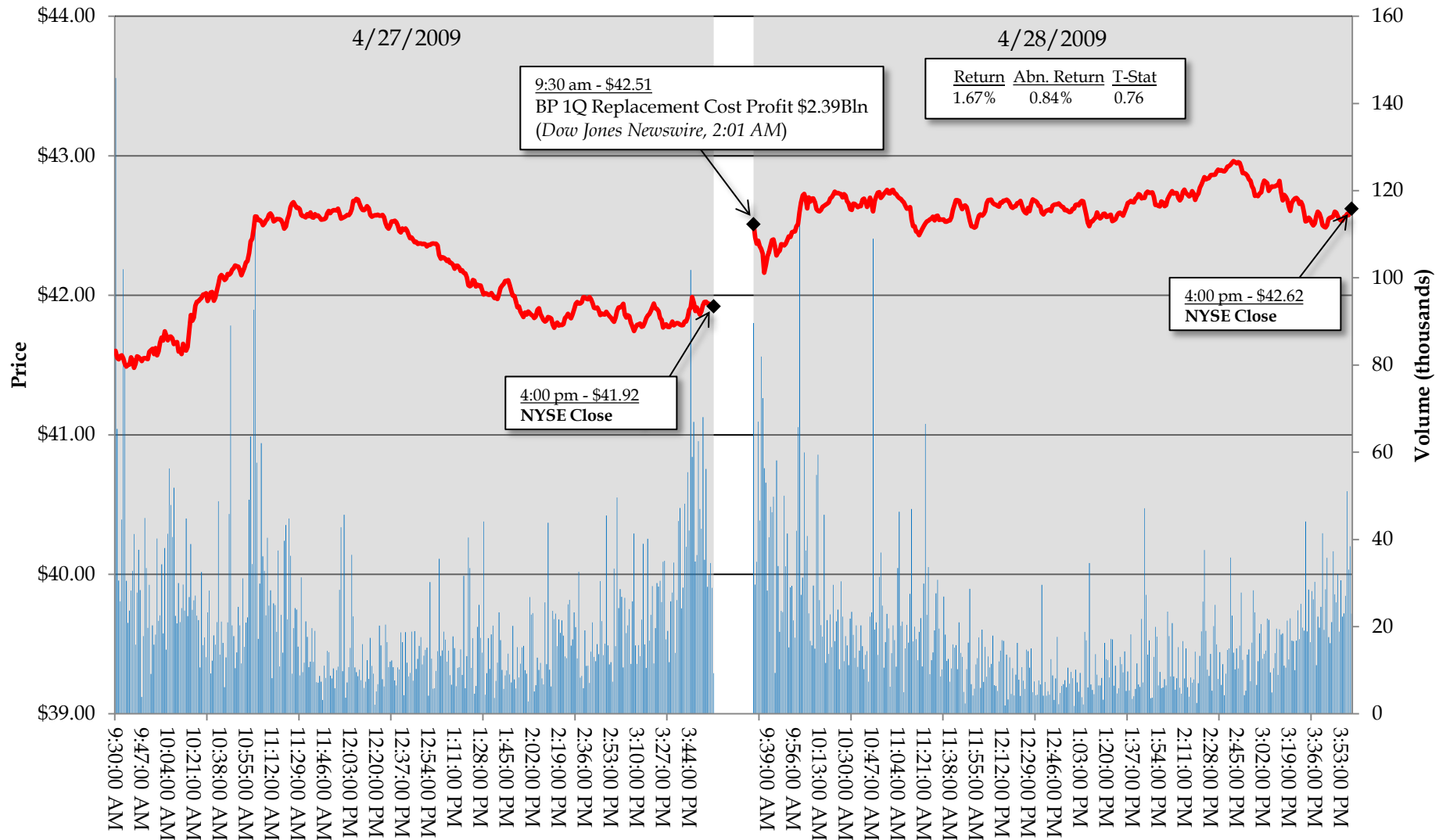
**Exhibit 9E**  
**BP Intraday ADS Price and Volume**  
**2/2/2009 - 2/3/2009 (Q4 FY 2008 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

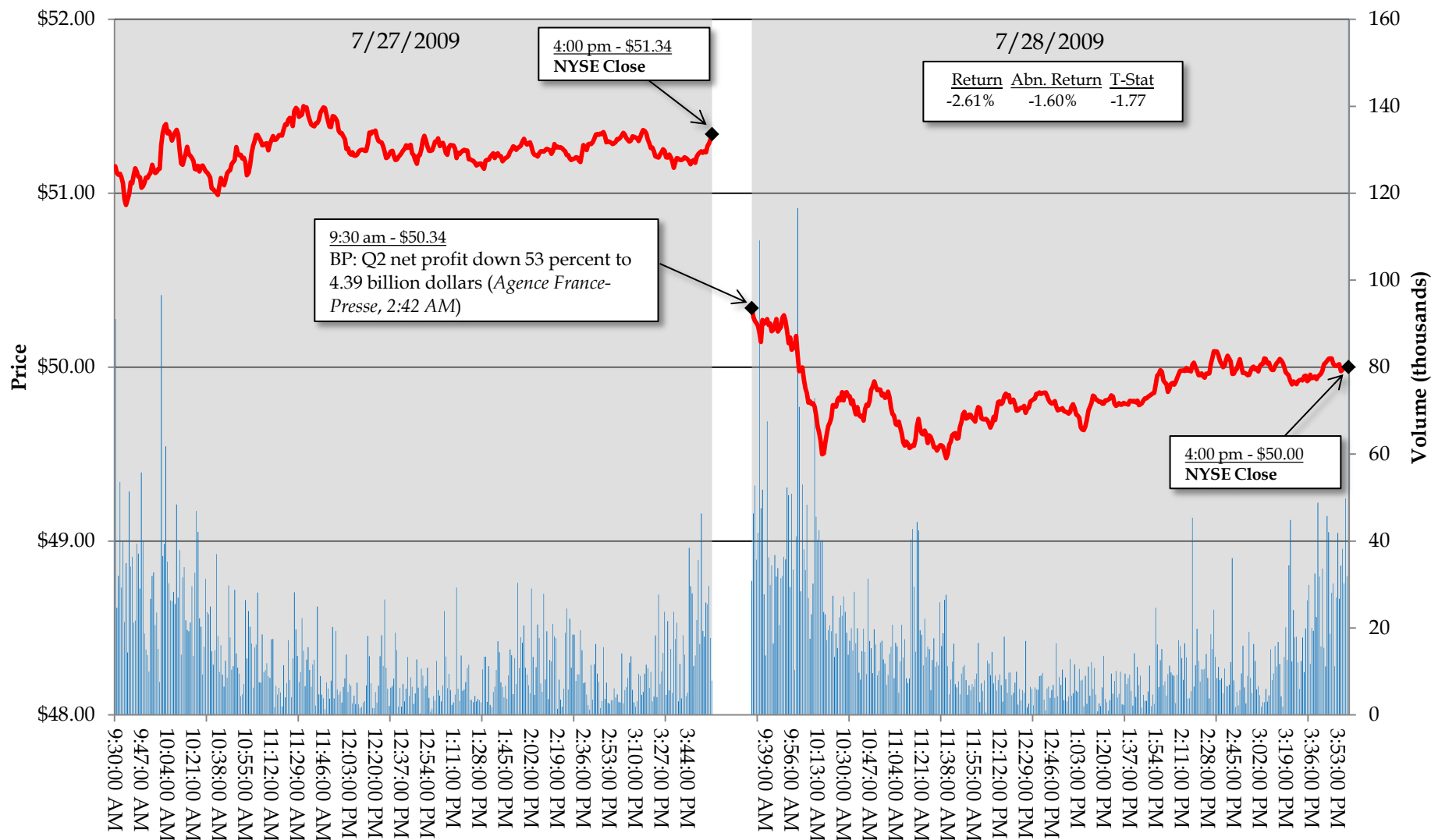
**Exhibit 9F**  
**BP Intraday ADS Price and Volume**  
**4/27/2009 - 4/28/2009 (Q1 FY 2009 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

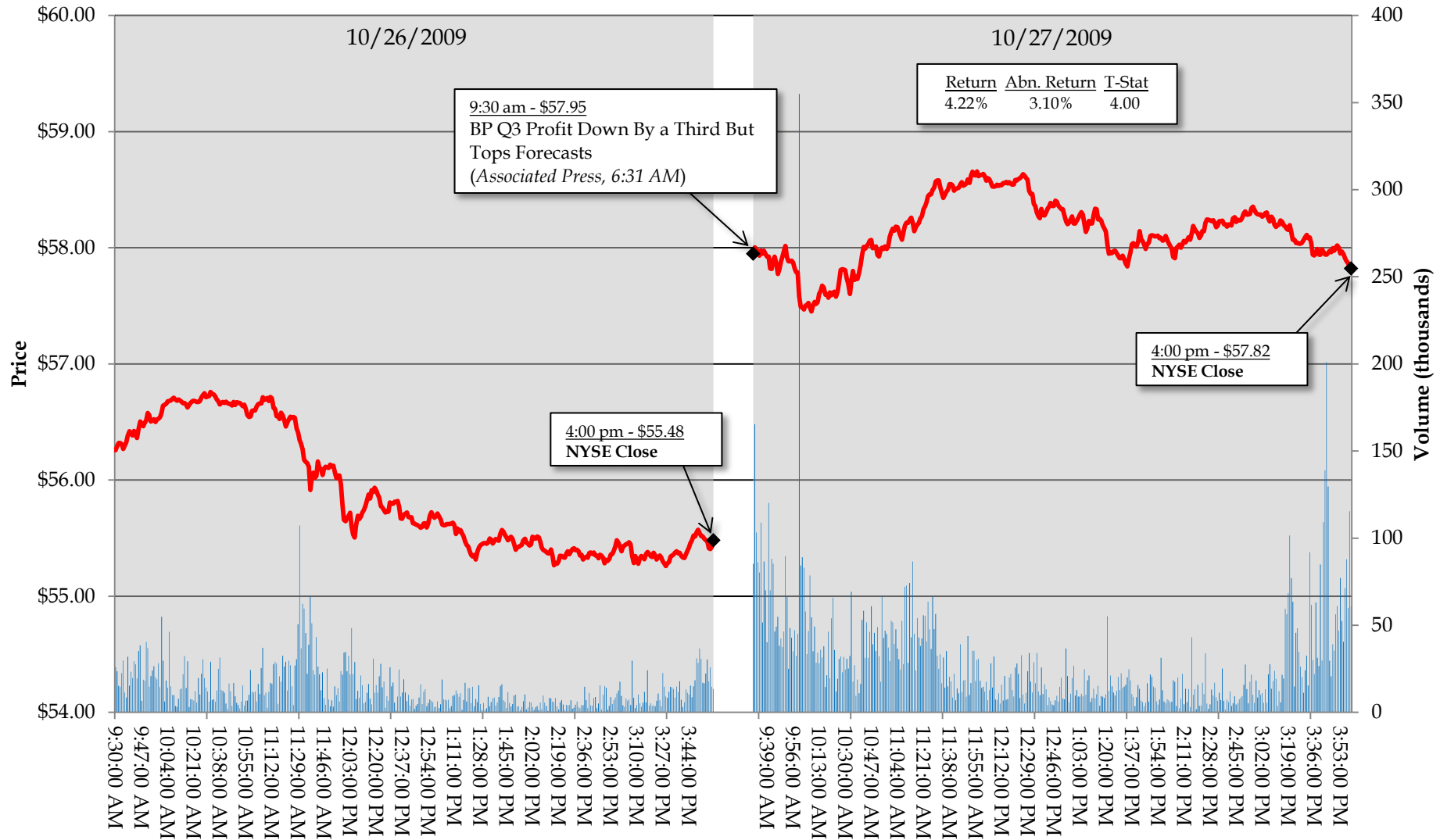
**Exhibit 9G**  
**BP Intraday ADS Price and Volume**  
**7/27/2009 - 7/28/2009 (Q2 FY 2009 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

**Exhibit 9H**  
**BP Intraday ADS Price and Volume**  
**10/26/2009 - 10/27/2009 (Q3 FY 2009 Earnings Announcement)**

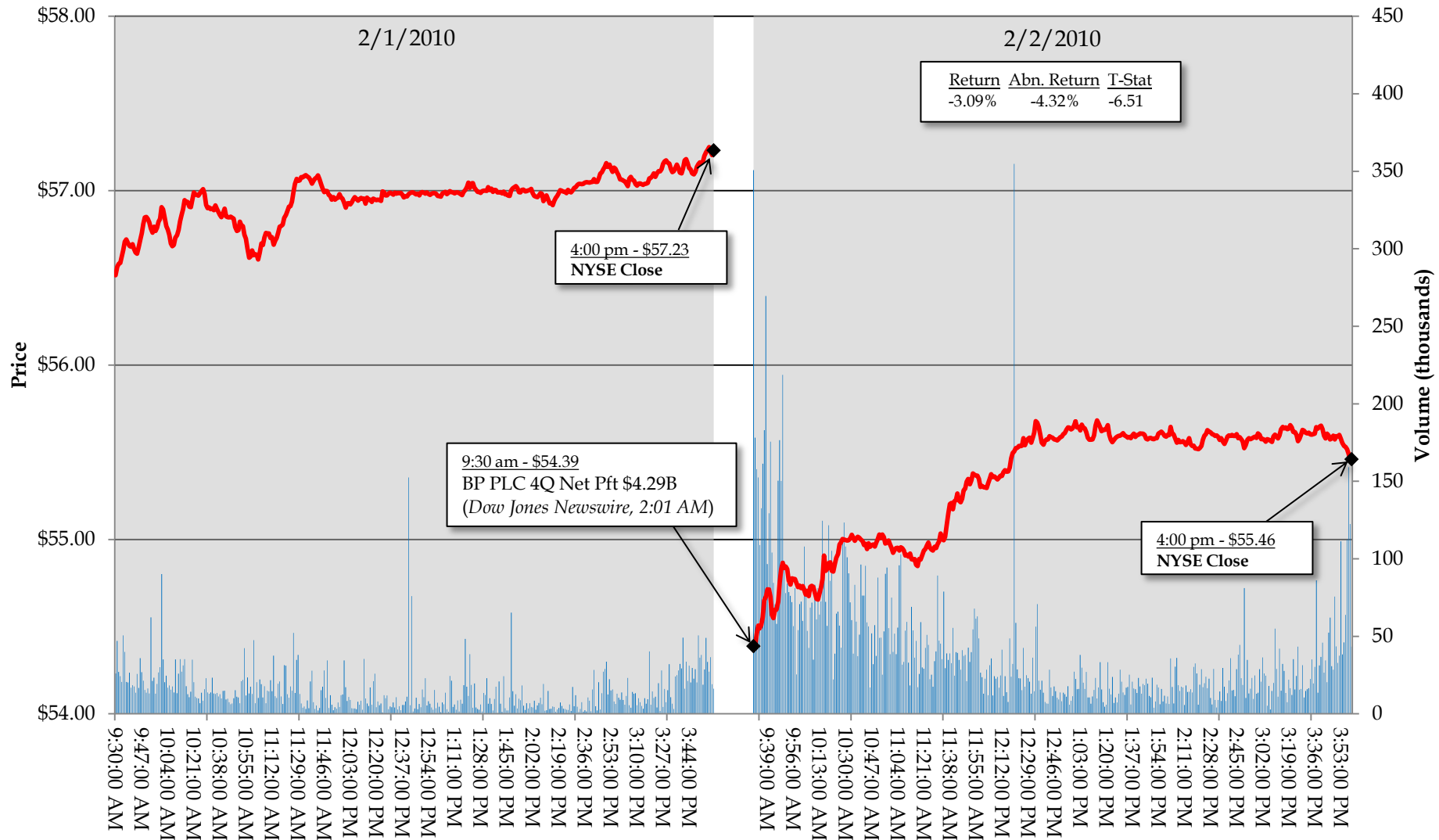


Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.



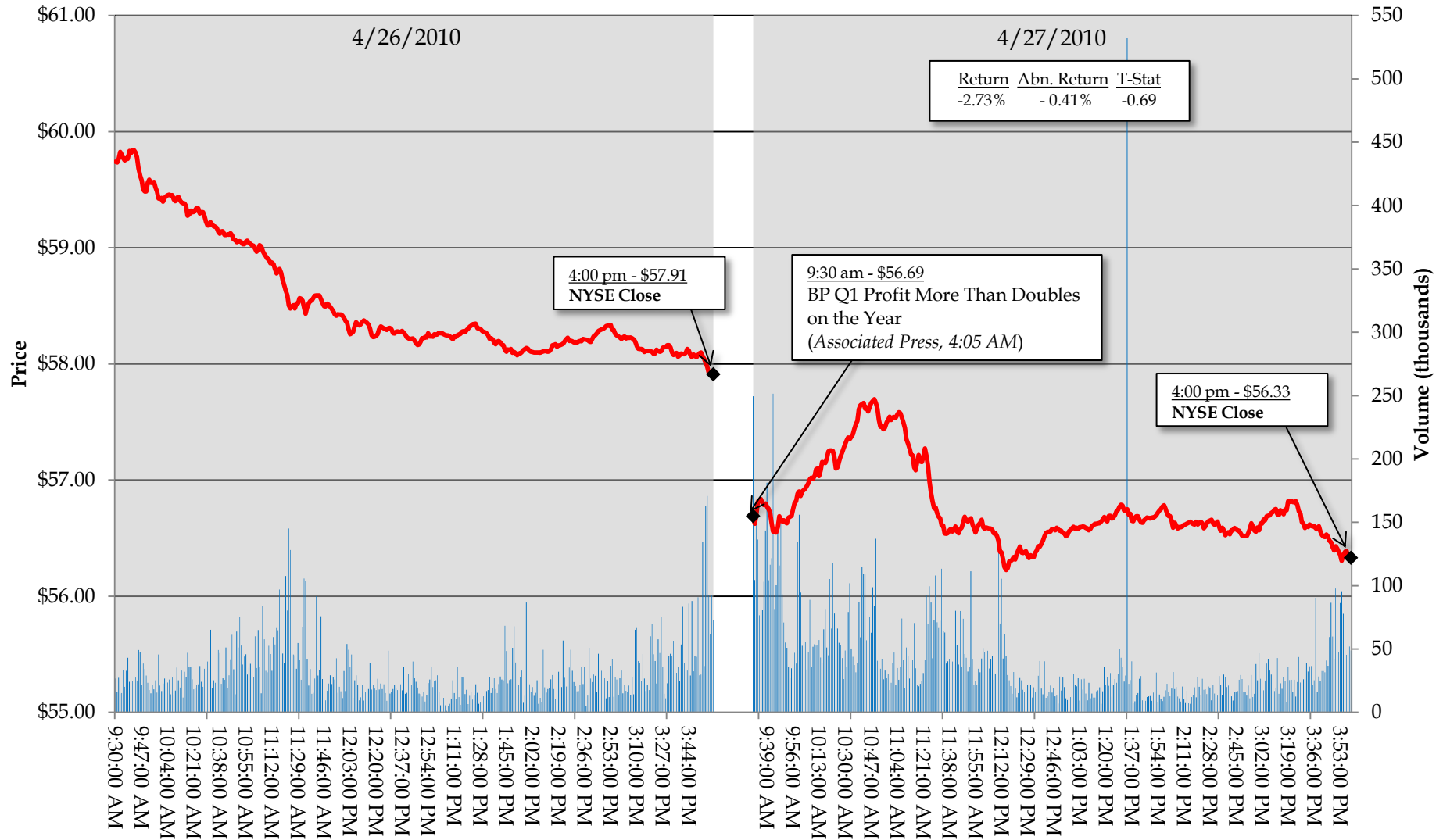
**Exhibit 9I**  
**BP Intraday ADS Price and Volume**  
**2/1/2010 - 2/2/2010 (Q4 FY 2009 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

**Exhibit 9J**  
**BP Intraday ADS Price and Volume**  
**4/26/2010 - 4/27/2010 (Q1 FY 2010 Earnings Announcement)**



Sources: TICK data; Bloomberg.

Note: Price is calculated as the volume weighted average price for each minute of the trading day except for the closing price, which is the reported price from Bloomberg.

**Exhibit 10**  
**BP ADS Market Capitalization**  
**Compared to Companies Traded on NYSE & NASDAQ**

<b>Last trading day of:</b>	<b>BP ADS Market Capitalization<sup>1</sup> (millions)</b>	<b>Percentile Rank in NYSE</b>	<b>BP's ADS Percentile Rank in NYSE &amp; NASDAQ</b>	<b>BP Market Capitalization (millions)</b>	<b>BP's Common Stock Percentile Rank in NYSE &amp; NASDAQ</b>
Q4 - 2008	\$42,032	96th	97th	\$143,630	99th
Q4 - 2009	\$50,089	95th	98th	\$181,800	99th
Q4 - 2010	\$39,153	92nd	97th	\$136,432	99th

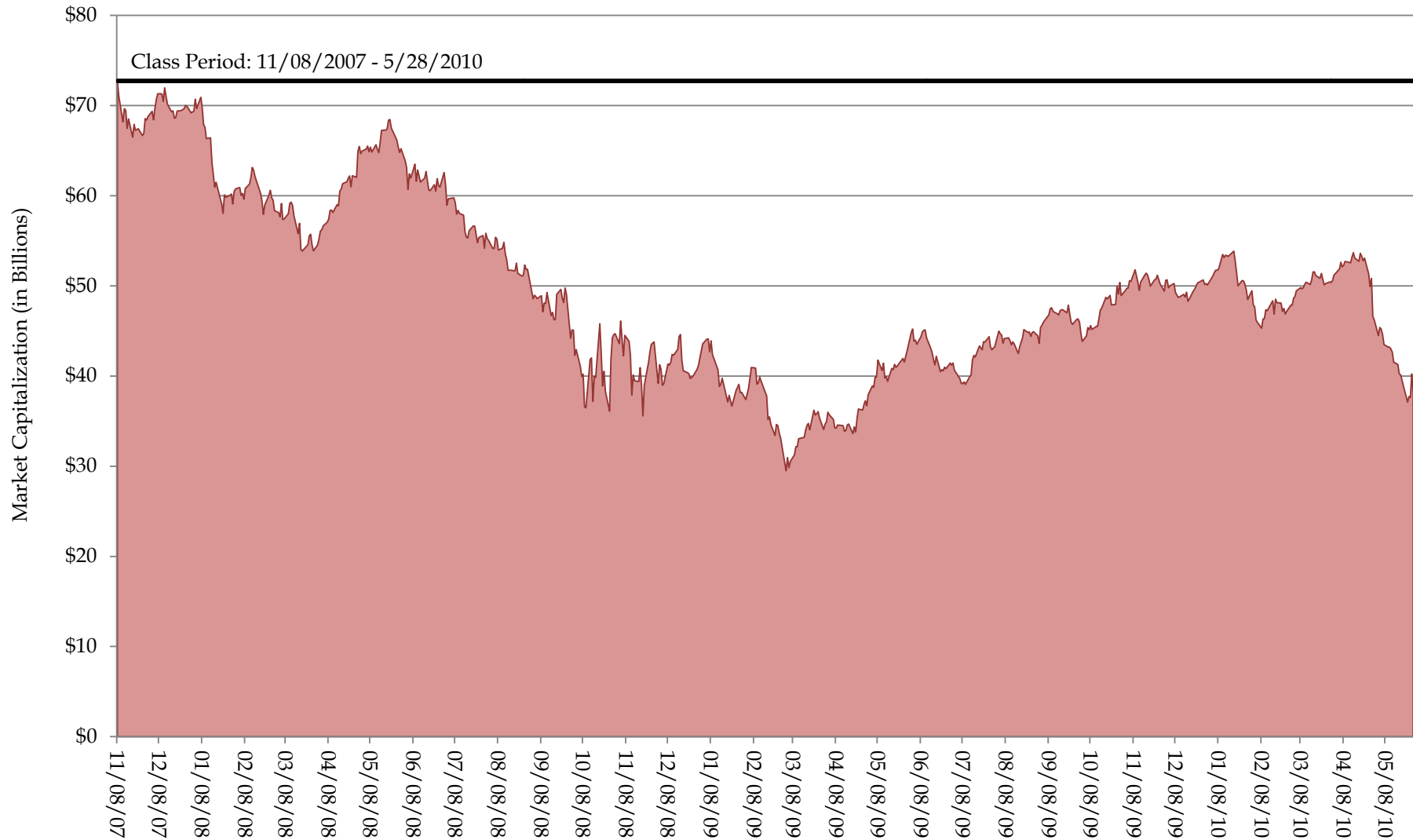
Sources: 20-F, Bloomberg

1) Market capitalization is based on amount of ADS outstanding reported in Forms 20-F as of the end of the fiscal years ended 12/31/2007, 12/31/2008, and 12/31/2009. Forms 20-F are issued once per year, therefore, ADS outstanding are carried forward until the next filing.

## Exhibit 11

### BP ADS Market Capitalization (in Billions)

11/8/2007 - 5/28/2010



Source: 20-F

Note: Market capitalization is based on amount of ADS outstanding reported in Forms 20-F as of the end of the fiscal years ended 12/31/2006, 12/31/2007, 12/31/2008, and 12/31/2009. Forms 20-F are issued once per year, therefore, ADS outstanding are carried forward until the next filing.

**Exhibit 12**  
**BP ADS Outstanding, Insider Holdings and Institutional Holdings**

Date	ADS Outstanding <sup>1</sup>	Insider Holdings <sup>2</sup>	Public Float: Shares Outstanding Less Insider Holdings	Insider Holdings % of Shares Outstanding	Total Institutional Holdings	Institutional Holdings % of Shares Outstanding	Institutional Holdings % of Public Float
9/30/2007	945,592,180	1,415,389	944,176,791	0.15%	378,177,089	39.99%	40.05%
12/31/2007	945,592,180	1,415,389	944,176,791	0.15%	400,353,129	42.34%	42.40%
3/31/2008	899,270,264	1,450,631	897,819,633	0.16%	395,154,182	43.94%	44.01%
6/30/2008	899,270,264	1,375,541	897,894,723	0.15%	394,978,912	43.92%	43.99%
9/30/2008	899,270,264	1,375,541	897,894,723	0.15%	370,929,923	41.25%	41.31%
12/31/2008	899,270,264	1,375,541	897,894,723	0.15%	353,994,786	39.36%	39.42%
3/31/2009	864,042,084	1,499,828	862,542,256	0.17%	343,990,879	39.81%	39.88%
6/30/2009	864,042,084	1,499,828	862,542,256	0.17%	356,781,239	41.29%	41.36%
9/30/2009	864,042,084	1,499,828	862,542,256	0.17%	349,141,689	40.41%	40.48%
12/31/2009	864,042,084	1,499,828	862,542,256	0.17%	351,285,471	40.66%	40.73%
3/31/2010	886,409,646	1,991,592	884,418,054	0.22%	360,458,314	40.66%	40.76%
6/30/2010	886,409,646	1,914,354	884,495,292	0.22%	359,443,351	40.55%	40.64%
<b>Average:</b>				<b>0.17%</b>		<b>41.36%</b>	<b>41.43%</b>

Sources: Capital IQ (BP - Depositary Receipt (Common Stock)); Bloomberg; SEC 20-F, 2006 - 2009.

1) Number of ADS outstanding is based on BP Forms 20-F as of the end of the fiscal years ended 12/31/2006, 12/31/2007, 12/31/2008, and 12/31/2009, respectively. Forms 20-F are issued once per year, therefore, ADS outstanding are carried forward until the next filings.

2) Insider holdings are based on BP Forms 20-F, 2007 - 2010. Forms 20-F are issued once per year, therefore, insider holdings are carried through the year from the date of first announcement.

**Exhibit 13**  
**BP ADS Autocorrelation Coefficients For the Class Period and By**  
**Calendar Quarter**

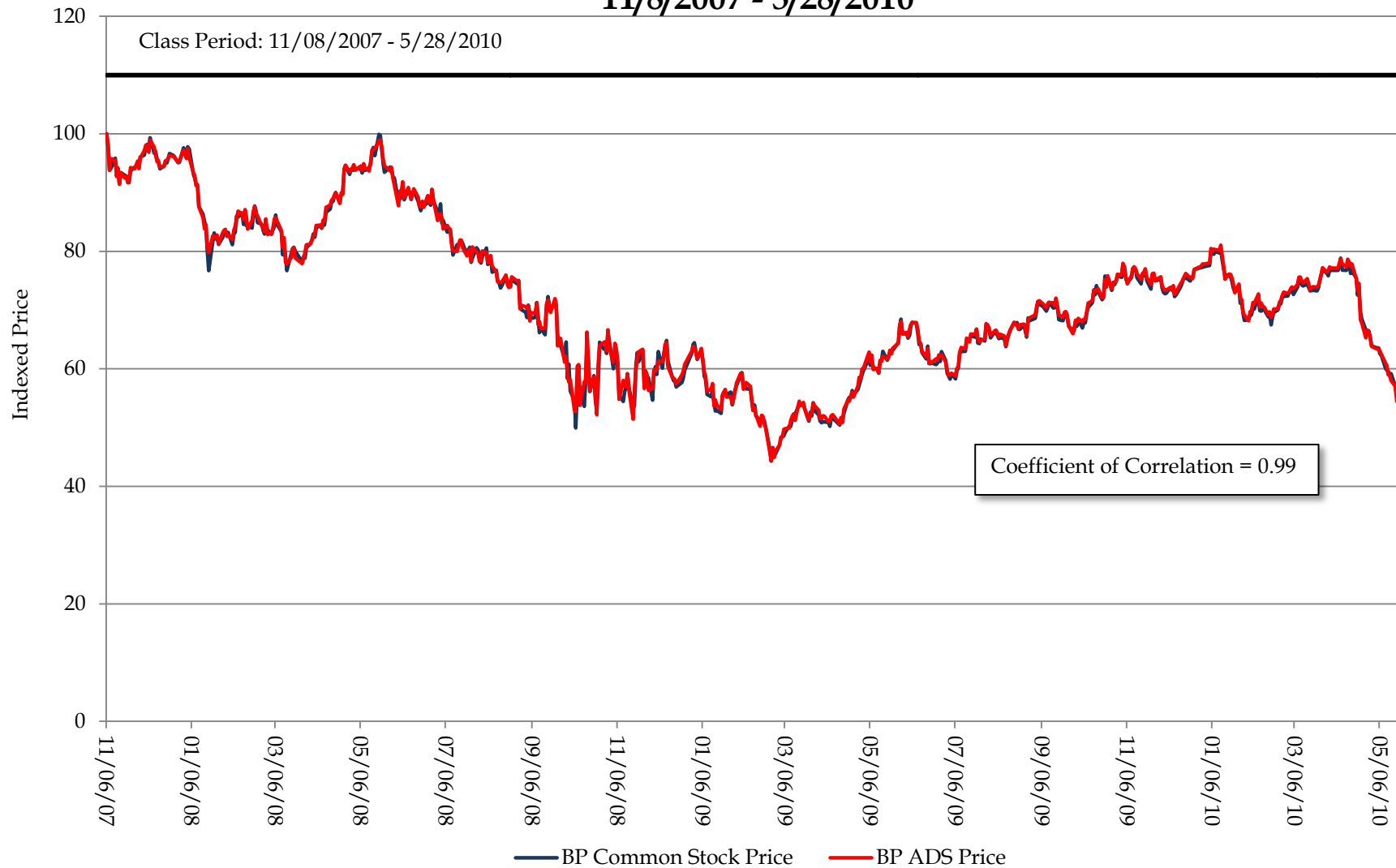
<b>Quarter</b>	<b>Coefficient on Previous Day Abnormal Return</b>	<b>T-statistic</b>
2007Q4	-0.21	-1.23
2008Q1	-0.01	-0.05
2008Q2	-0.07	-0.53
2008Q3	0.00	0.01
2008Q4	-0.09	-0.74
2009Q1	-0.19	-1.44
2009Q2	0.17	1.40
2009Q3	-0.27	-2.18
2009Q4	0.13	0.98
2010Q1	-0.13	-1.02
2010Q2	-0.18	-0.95
<b>Class Period</b>	<b>-0.08</b>	<b>-1.94</b>

Source: Bloomberg.

### Exhibit 14

## BP ADS Closing Prices and BP Common Stock Closing Prices indexed to a 100 value at the beginning of the Class Period

11/8/2007 - 5/28/2010



Source: Bloomberg

Notes: Non-trading days and holidays for New York Stock Exchange are excluded from the analysis. Prices are not adjusted for dividends.

## **Appendix A**

### **List of Documents Relied Upon**

I relied upon all documents referenced in my report.

#### **Court Documents**

- Second Consolidated Amended Class Action Complaint For All Purchasers of BP ADS Securities, filed April 2, 2012.
- Memorandum and Order by the Honorable Keith P. Ellison, dated February 6, 2013.

#### **Court Decisions and Securities Law**

- *Basic v. Levinson*, 485 U.S. 224, 241-42 (1988).
- *Cammer v. Bloom*, 711 F. Supp. 1264 (D.N.J. 1989).

#### **SEC Filings/Forms**

- BP plc Form 20-F for fiscal years 2006, 2007, 2008, 2009, and 2010.
- BP plc filed Form F-3s on July 27, 2001, February 22, 2002, and November 18, 2008.
- Form F-3 eligibility information from <http://www.sec.gov/about/forms/formf-3.pdf>.
- <http://www.sec.gov/about/forms/form13f.pdf>

#### **Security Data**

- Historical data for BP plc American Depositary Shares, selected peers, S&P 500 Total Return Index, and the GBP-USD exchange rate obtained from Bloomberg.
- Quote data for BP plc American Depositary Shares during the Class Period, and quote data for 100 random companies traded on the New York Stock Exchange and NASDAQ for October 2008 and were obtained from [www.tickdata.com](http://www.tickdata.com).
- The market capitalization of all the companies that were traded in the NYSE and the NASDAQ as of December 31, 2008, December 31, 2009, and December 31, 2010 was acquired from Bloomberg.
- Option contract volume data for BP plc American Depositary shares obtained from Bloomberg.
- Turnover velocity data for NYSE from the World Federation of Exchanges see <http://www.world-exchanges.org/statistics>.
- Institutional Holdings data obtained from Thomson Reuters.



### **News**

- News headlines obtained through a Factiva search for the period November 8, 2007 through May 28, 2010.
- “BP Hits a Record But Warns of Russia Risk,” *Financial Times*, July 29, 2008.

### **Analyst Reports**

- Analyst reports were obtained through Investext.
- “Recovering Operating Momentum, But Uncertainty Surrounds TNK,” *CIBC*, July 30, 2008.
- “Uncertainty Over TNK Overshadows Record Earnings,” *Oppenheimer*, July 31, 2008.
- “Mitigating risks from the GoM,” *Morgan Stanley*, April 27, 2010.
- “First Look: Higher Oil & Gas Prices Lift 1Q10 Earnings Above Consensus,” *Oppenheimer*, April 27, 2010.
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- Yakov Amihud, Haim Mendelson and Lasse Heje Pedersen, 2006, “Liquidity and Asset Prices,” *Foundations and Trends in Finance* Vol. 1, No. 4.
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- William H. Beaver “The Information Content of Annual Earnings Announcements,” *Empirical Research in Accounting: Selected Studies, 1968*, supplement to the *Journal of Accounting Research*, Vol. 6, 1968.
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- Eugene Fama, “Efficient Capital Markets: A Review of Theory and Empirical Work,” *Journal of Finance*, Vol. 25, 1970.
- William H. Greene, *Econometric Analysis*, Prentice Hall, Sixth Edition, 2008, Chapter 19.
- Roger D. Huang, Hans R. Stall, “Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE,” *Journal of Financial Economics* Vol. 41, 1996.
- Michael C. Jensen, “Some Anomalous Evidence Regarding Market Efficiency,” *Journal of Financial Economics* Vol. 6, Nos. 2/3, 1978.
- Raman Kumar, Atulya Sarin and Kuldeep Shastri, “The Impact of Options Trading on the Market Quality of the Underlying Security: An Empirical Analysis,” *The Journal of Finance*, Vol. LIII, No. 2, April 1998.
- A. Craig MacKinlay, “Event Studies in Economics and Finance,” *Journal of Economic Literature*, Vol. 35, No. 1, March 1997.
- Robert G. May, “The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes,” *Journal of Accounting Research*, Vol. 9, Empirical Research in Accounting: Selected Studies 1971.
- Stephen A. Ross, “Options and Efficiency,” *The Quarterly Journal of Economics*, Vol. 90, February 1977.
- William F. Sharpe, Gordon J. Alexander, and Jeffery V. Bailey, *Investments*, Prentice Hall, Fifth Edition, 1995.
- David I. Tabak and Frederick C. Dunbar, “Materiality and Magnitude: Event Studies in the Courtroom,” Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001.
- Randall S. Thomas and James F. Cotter, “Measuring Securities Market Efficiency in the Regulatory Setting,” *Law and Contemporary Problems* Vol. 63.
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#### **Other**

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- [http://money.cnn.com/magazines/fortune/global500/2010/full\\_list/index.html](http://money.cnn.com/magazines/fortune/global500/2010/full_list/index.html)
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<http://www.sec.gov/info/smallbus/secg/s3f3-secg.htm>

**APPENDIX B**  
**CHAD W. COFFMAN, CFA**

Global Economics Group, LLC  
140 South Dearborn Street, Suite 1000  
Chicago, IL 60603  
Office: (312) 470-6500  
Mobile: (815) 382-0092  
Email: ccoffman@globaleconomicsgroup.com

**EMPLOYMENT:**

**Global Economics Group, LLC**

President (2008 - Current)

Global Economics Group specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including litigation and policy matters throughout the world. With offices in Chicago, Boston, San Francisco and Atlanta, Principals of Global Economics Group have extensive experience in high-profile securities, antitrust, labor, and intellectual property matters.

**Market Platform Dynamics, LLC**

Chief Financial Officer & Chief Operating Officer (2010 – Current)

Market Platform Dynamics is a management consulting firm that specializes in assisting platform-based companies profit from industry disruption caused by the introduction of new technologies, new business models and/or new competitive threats. MPD's experts include economists, econometricians, product development specialists, strategic marketers and recognized thought leaders who apply cutting-edge research to the practical problems of building and running a profitable business.

**Chicago Partners, LLC**

Principal (2007 – 2008)

Vice President (2003 – 2007)

Director (2000 – 2003)

Senior Associate (1999 – 2000)

Associate (1997 – 1999)

Research Analyst (1995 – 1997)

**EDUCATION:**

**CFA** Chartered Financial Analyst, 2003

**M.P.P.** University of Chicago, 1997

Masters of Public Policy, with a focus in economics including coursework in Finance, Labor Economics, Econometrics, and Regulation

**B.A.** Knox College, 1995  
Economics, Magna Cum Laude  
Graduated with College Honors for Paper entitled “Increasing Efficiency in Water Supply Pricing: Using Galesburg, Illinois as a Case Study”  
Dean's List Every Term  
Phi Beta Kappa

## **SELECTED EXPERIENCE:**

### Experience in Securities and Valuation Cases:

- Expert consultant for Citigroup/Salomon Smith Barney in various matters related to Jack Grubman’s analyst coverage of various companies. This included supporting multiple experts at high-profile arbitration where plaintiffs claimed \$900 million in damages. Arbitration panel returned a verdict in favor of client (reported in Wall Street Journal).
- Expert damages consultant in dozens of 10b-5 and Section 11 securities litigation, including, but not limited to:
  - WorldCom
  - Enron
  - Tyco
  - Parmalat
  - Sears
  - Atlas Air
  - UnumProvident
  - XL Capital
  - Household Finance/HSBC
  - Dynegy
  - Anicom
- Expert consultant in multiple cases involving market timing and/or late-trading. Developed models to estimate market timing profits.
- Served as neutral expert for mediator (Judge Daniel Weinstein) in multiple 10(b)-5 securities cases as well as futures manipulation case.
- Expert consultant for the American Stock Exchange (AMEX) where I evaluated issues related to multiple listing of options. Performed econometric analysis of various measures of option spread using tens of millions of trades.
- Expert consultant to large hedge fund that owned bonds in WorldCom. Responsible for directing analysis that led to favorable settlement of their claim in the bankruptcy.
- Performed detailed audit of CDO valuation models employed by a banking institution to satisfy regulators – non-litigation matter.

- Played significant role in highly-publicized internal accounting investigations of two Fortune 500 companies. One led to restatement of previously issued financial statements and both involved SEC investigations.
- Testifying expert in the matter of Kuo, Steven Wu v. Xceedium Inc, Supreme Court of New York, County of New York, Index No. 06-100836. Filed report re: the fair value of Mr. Kuo's shares. Case settled at trial.
- Testifying expert in the matter of Pallas, Dennis H. v. BPRS/Chestnut Venture Limited Partnership and Gerald Nudo, Circuit Court of Cook County, Illinois, County Department, Chancery Division. Filed report re: fair value of Pallas shares. Report: July 9, 2008. Deposition August 6, 2008. Court Testimony February 11, 2009.
- Testifying expert in Washington Mutual Securities Litigation, United States District Court, Western District of Washington, at Seattle, No. 2:08-md-1919 MJP, Lead Case No. C08-387 MJP. Filed declaration August 5, 2008 re: plaintiffs' loss causation theory. Filed expert report April 30, 2010. Filed rebuttal expert report August 4, 2010.
- Testifying expert in DVI Securities Litigation, Case No. 2:03-CV-05336-LDD, United States District Court for the Eastern District of Pennsylvania. Filed expert report October 1, 2008 re: damages. Filed rebuttal expert report December 17, 2008. Deposition January 27, 2009.
- Testifying expert in Syrtech Corporation v. Lifetime Brands, Inc. and Syrtech Acquisition Corporation, Supreme Court of the State of New York, Index No. 603568/2007. Filed expert report October 31, 2008.
- Expert declaration in Jacksonville Police and Fire Pension Fund, et al. v. AIG, Inc., et al., No. 08-CV-4772-LTS; James Connolly, et al. v. AIG, Inc., et al., No. 08-CV-5072-LTS; Maine Public Employees Retirement System, et al. v. AIG, Inc., et al., No. 08-CV-5464-LTS; and Ontario Teachers' Pension Plan Board, et al. v. AIG, Inc., et al., No. 08-CV-5560-LTS, United States District Court, Southern District of New York. Filed declaration February 18, 2009.
- Expert declaration in Connetics Securities Litigation, Case No. C 07-02940 SI, United States District Court for the Northern District of California, San Francisco Division. Filed expert report March 16, 2009.
- Testifying expert in Boston Scientific Securities Litigation, Master File No. 1:05-cv-11934 (DPW), United States District Court District of Massachusetts. Filed expert report August 6, 2009. Deposition October 6, 2009.
- Expert declaration in Louisiana Sheriffs' Pension and Relief Fund, et al. v. Merrill Lynch & Co, Inc., et al., Case Number 08-cv-09063, United States District Court, Southern District of New York. Filed declaration October, 2009.
- Testifying expert in Henry J. Wojtunik v. Joseph P. Kealy, John F. Kealy, Jerry A. Kleven, Richard J. Seminoff, John P. Stephen, C. James Jensen, John P. Morbeck, Terry W. Beiriger, and Anthony T. Baumann. Filed expert report on January 25, 2010.

- Testifying expert in REFCO Inc. Securities Litigation, Case No. 05 Civ. 8626 (GEL), United States District Court for the Southern District of New York. Filed expert report February 2, 2010. Filed rebuttal expert report March 12, 2010. Deposition March 26, 2010.
- Expert declaration in New Century Securities Litigation, Case No. 07-cv-00931-DDP, United States District Court Central District of California. Filed declaration March 11, 2010.
- Testifying expert in Louisiana Municipal Police Employees' Retirement System, et. al. v. Tilman J. Fertitta, Steven L. Scheinthal, Kenneth Brimmer, Michael S. Chadwick, Michael Richmond, Joe Max Taylor, Fertitta Holdings, Inc., Fertitta Acquisition Co., Richard Liem, Fertitta Group, Inc. and Fertitta Merger Co, C.A. No. 4339-VCL, Court of Chancery of the State of Delaware. Filed expert report April 23, 2010.
- Testifying expert in Edward E. Graham and William C. Nordlund, individually and d/b/a Silver King Capital Management v. Eton Park Capital Management, L.P., Eton Park Associates, L.P. and Eton Park Fund, L.P. Case No. 1:07-CV-8375-GBD, Circuit Court of Shelby County, Alabama. Filed rebuttal expert report July 8, 2010. Deposition September 1, 2010. Filed supplemental rebuttal expert report August 22, 2011.
- Testifying expert in Moody's Corporation Securities Litigation. Case No. 1:07-CV-8375-GBD), United States District Court for the Southern District of New York. Filed rebuttal expert report August 23, 2010. Deposition October 7, 2010. Filed rebuttal reply report November 5, 2010. Filed expert report May 25, 2012.
- Testifying expert in Minneapolis Firefighters' Relief Association v. Medtronic, Inc., et al. Civil No. 08-6324 (PAM/AJB), United States District Court, District of Minnesota. Filed expert report January 14, 2011.
- Testifying expert in Schering-Plough Corporation/ENHANCE Securities Litigation Case No.2:08-cv-00397 (DMC) (JAD), United States District Court, District of New Jersey. Filed declaration February 7, 2011. Filed expert report September 15, 2011. Filed rebuttal expert report October 28, 2011. Filed declaration January 30, 2012. Deposition November 15, 2011 and November 29, 2011.
- Testifying expert in Fannie Mae 2008 Securities Litigation, Master File No. 08 Civ. 7831 (PAC), United States District Court for the Southern District of New York. Filed expert report July 18, 2011.
- Testifying expert in Bank of America Corp. Securities, Derivative, and Employee Retirement Income Security Act (ERISA) Litigation, Master File No. 09 MDL 2058 (PKC), United States District Court for the Southern District of New York. Filed expert report August 29, 2011. Filed rebuttal expert report September 26, 2011. Filed expert report March 16, 2012. Filed rebuttal expert report April 9, 2012. Filed rebuttal expert report April 29, 2012. Deposition October 14, 2011 and May 24, 2012.
- Testifying expert in Toyota Motor Corporation Securities Litigation, Case No. 10-922 DSF (AJWx), United States District Court, Central District of California. Filed expert report February 17, 2012. Deposition March 28, 2012. Filed rebuttal expert report August 2, 2012. Filed declaration re: Plan of Allocation, January 28, 2013.



- Testifying expert in Aracruz Celulose S.A. Securities Litigation, Case No. 08-23317-CIV-LENARD, United States District Court, Southern District of Florida. Filed expert report July 20, 2012. Deposition September 14, 2012. Filed rebuttal expert report October 29, 2012. Filed declaration re: Plan of Allocation, May 20, 2013.
- Testifying expert in In Re Computer Sciences Corporation Securities Litigation, CIV. A. No. 1:11-cv-610-TSE-IDD, United States District Court, Eastern District of Virginia, Alexandria Division. Filed expert report November 9, 2012. Filed supplemental report February 18, 2013. Filed rebuttal expert report March 25, 2013. Deposition March 27, 2013.
- Testifying expert in In Re Weatherford International Securities Litigation, Case 1:11-cv-01646-LAK, United States District Court for the Southern District of New York. Filed expert report April 1, 2013.
- Testifying expert in In Re: Regions Morgan Keegan Closed-End Fund Litigation, Case 2:07-cv-02830-SHM-dkv, United States District Court for the Western District of Tennessee Western Division. Court testimony April 12, 2013.
- Testifying expert in City of Roseville Employees' Retirement System and Southeastern Pennsylvania Transportation Authority, derivatively on behalf of Oracle Corporation, Plaintiff, v. Lawrence J. Ellison, Jeffrey S. Berg, H. Raymond Bingham, Michael J. Boskin, Safra A. Catz, Bruce R. Chizen, George H. Conrades, Hector Garcia-Molina, Donald L. Lucas, and Naomi O. Seligman, Defendants, and Oracle Corporation, Nominal Defendant, C.A. No. 6900-CS, Court of Chancery of the State of Delaware. Filed expert report May 13, 2013.

#### Experience in Labor Economics and Discrimination-Related Cases:

- Expert consultant for Cargill in class action race discrimination matter in which class certification was defeated.
- Expert consultant for 3M in class action age discrimination matter.
- Expert consultant for Wal-Mart in class action race discrimination matter.
- Expert consultant for Novartis regarding various labor related issues.
- Expert consultant on various other significant confidential labor economics matters in which there were class action allegations related to race and gender.
- Expert consultant for large insurance company related to litigation and potential regulation resulting from the use of credit scores in the insurance underwriting process.
- Testifying expert in Shirley Cohens v. William Henderson, Postmaster General, C.A 1:00CV-1834 (TFH) United States Postal Service, United States District Court for the District of Columbia.– Filed report re: lost wages and benefits.
- Testifying expert in Richard Akins v. NCR Corporation. Before the American Arbitration Association – Filed report re: lost wages.



- Testifying expert in Maureen Moriarty v. Dyson, Inc., Case No. 09 CV 2777, United States District Court for the Northern District of Illinois, Eastern Division. Filed expert report October 12, 2011. Deposition November 10, 2011.

Selected Experience in Antitrust, General Damages, and Other Matters:

- Expert consultant in high-profile antitrust matters in the computer and credit card industries.
- Expert consultant for plaintiffs in re: Brand Name Drugs Litigation. Responsible for managing, maintaining and analyzing data totaling over one billion records in one of the largest antitrust cases ever filed in the Federal Courts.
- Served as neutral expert for mediator (Judge Daniel Weinstein) in allocating a settlement in an antitrust matter.
- Expert consultant in Seminole County and Martin County absentee ballot litigation during disputed presidential election of 2000.
- Expert consultant for sub-prime lending institution to determine effect of alternative loan amortization and late fee policies on over 20,000 customers of a sub-prime lending institution. Case settled favorably at trial immediately after the testifying expert presented an analysis I developed showing fundamental flaws in opposing experts calculations.

**TEACHING EXPERIENCE:**

KNOX COLLEGE, Teaching Assistant - Statistics, (1995)  
KNOX COLLEGE, Tutor in Mathematics, (1992 - 1993)

**PUBLICATIONS:**

Coffman, Chad and Mary Gregson, "Railroad Construction and Land Value." *Journal of Real Estate and Finance*, 16:2, pp. 191-204 (1998).

Coffman, Chad, Tara O'Neil, and Brian Starr, Ed. Richard D. Kahlenberg, "An Empirical Analysis of the Impact of Legacy Preferences on Alumni Giving at Top Universities," *Affirmative Action for the Rich: Legacy Preferences in College Admissions*; pp. 101-121 (2010).

**PROFESSIONAL AFFILIATIONS:**

Associate Member CFA Society of Chicago  
Associate Member CFA Institute  
Phi Beta Kappa

**AWARDS:**

1994 Ford Fellowship Recipient for Summer Research.

1993 Arnold Prize for Best Research Proposal.

1995 Knox College Economics Department Award.

**PERSONAL ACTIVITIES:**

Pro bono consulting for Cook County State's Attorney's Office.

Pro bono consulting for Cook County Health & Hospitals System – Developed method for hospital to assess real-time patient level costs to assist in improving care for Cook County residents and prepare for implementation of Affordable Care Act.